

North Valley Passenger Rail Strategic Plan

CHICO • GRIDLEY • MARYSVILLE/YUBA CITY
PLUMAS LAKE • SACRAMENTO

Final Report
May 2024

Funded in part by Caltrans Sustainable Transportation Planning Grant Program

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List of Acronyms and Abbreviations

AB	Assembly Bill	MP	milepost
AC Transit	Alameda–Contra Costa Transit District	MPDG	Multimodal Project Discretionary Grant
ACCMA	Alameda County Congestion Management Agency	MPO	metropolitan planning organization
ACE	Altamont Corridor Express	MSA	Metropolitan Statistical Area
ACTC	Alameda County Transportation Commission	MTC	Metropolitan Transportation Commission
BART	(San Francisco) Bay Area Rapid Transit (District)	MTS	(San Diego) Metropolitan Transit System
BCAG	Butte County Association of Governments	NAHC	Native American Heritage Commission
CAF	capital access fee	NEPA	National Environmental Policy Act
Cal-ITP	California Integrated Travel Project	NCTD	North County Transit District
CalSTA	California State Transportation Agency	NTD	National Transit Database
CAP	Community Assistance Program	O&M	operations and maintenance
CCJPA	Capitol Corridor Joint Powers Authority	OHP	(California) Office of Historic Preservation
CCTA	Contra Costa Transportation Authority	PA&ED	Project Approval and Environmental Document
CCTV	closed-circuit television	PDF	Portable Document File
CDFW	California Department of Fish and Wildlife	PDT	Project Development Team
CDP	census-designated place	PE	Preliminary Engineering
CEQA	California Environmental Quality Act	PS&E	Plans, Specifications, and Estimates
CIG	Capital Investment Grants	Q&A	question-and-answer
COG	Council of Governments	RABA	Redding Area Bus Authority
Corridor ID	Corridor Identification and Development	RAISE	Rebuilding American Infrastructure with Sustainability and Equity
CP	Control Point	RFI	Request for Information
CPUC	California Public Utilities Commission	RFP	Request for Proposals
CRISI	Consolidated Rail Infrastructure and Safety Improvements	ROW	right-of-way
CSA	Combined Statistical Area	RTC	Regional Transit Connection
CSRP	California State Rail Plan	RTP	Regional Transportation Plan
CSU	California State University	SACOG	Sacramento Area Council of Governments
CTC	County Transportation Commission	SacRT	Sacramento Regional Transit
CVFPB	Central Valley Flood Protection Board	SB	Senate Bill
CVRWG	Central Valley Rail Working Group	SCCP	Solutions for Congested Corridors
DFC	Discount Fare Card	SJCOG	San Joaquin Council of Governments
DMV	Department of Motor Vehicles	SJJPA	San Joaquin Joint Powers Authority
DTSC	(California) Department of Toxic Substances Control	SJRRC	San Joaquin Regional Rail Commission
DWR	(California) Department of Water Resources	SLC	(California) State Lands Commission
EIR	Environmental Impact Report	SMF	Sacramento International Airport
EIS	Environmental Impact Statement	SPA	Special Planning Area
EOS	Early Operating Segment	SR	State Route
ETO	Early Train Operator	SRA	State Rail Assistance
FEMA	Federal Emergency Management Agency	SRTA	Shasta Regional Transportation Agency
FSP	Federal–State Partnership	STA	State Transit Assistance
FTA	Federal Transit Administration	STIP	State Transportation Improvement Program
GHG	greenhouse gas	SWRCB	State Water Resources Control Board
GTFS	General Transit Feed Specification	TCAG	Tulare County Association of Governments
HSR	high-speed rail	TCEP	Trade Corridor Enhancement Program
IDOT	Illinois Department of Transportation	TIRCP	Transit and Intercity Rail Capital Program
JPA	joint powers authority	TOD	transit-oriented development
KCAG	Kings County Association of Governments	UP	Union Pacific (Railroad)
LACMTA	Los Angeles County Metropolitan Transportation Authority	UPRR	Union Pacific Railroad
LAVTA	Livermore Amador Valley Transit Authority	USACE	United States Army Corps of Engineers
LIFE	Low Income Fare is Easy	USCG	United States Coast Guard
LTF	Local Transportation Fund	USFWS	United States Fish and Wildlife Service
MCAG	Merced County Association of Governments	VMT	vehicle miles traveled
MITC	Merced Intermodal Track Connection	VTA	(Santa Clara) Valley Transportation Authority
		WREC	Wildcat Recreation Center
		YOE	year-of-expenditure
		ZEMU	zero-emission multiple-unit

Executive Summary

What is the purpose of the Strategic Plan?

The North Valley Passenger Rail Strategic Plan is a blueprint for establishing a new passenger rail service to link Butte, Yuba, and Sutter counties with Sacramento and the rest of the state. It describes the initial planning and development process to define the project, including selecting a proposed route and stations, as well as the stakeholder and community engagement work to bring public input into this initial planning effort. It also describes a funding and implementation strategy to move the project forward to environmental clearance, detailed design, construction, and eventual operation.

What is the Proposed Project?

North Valley Rail (the “Project”) builds upon already-planned expansions to the Altamont Corridor Express (ACE) and Amtrak *San Joaquins* systems by extending trains north of Natomas into the North Valley. An initial “starter” service of four roundtrips/day would begin running within the next decade, serving four stations in the North Valley, at Plumas Lake, Marysville–Yuba City, Gridley, and Chico. Bus connections would be provided for Oroville (via Gridley) and Sacramento International Airport (via Natomas).

Trains would continue south of Natomas to/from Sacramento and other parts of the state, including Stockton, the Bay Area, and the heart of the San Joaquin Valley. In Merced, three of the four roundtrips/day would have timed transfers with the future high-speed rail line currently under construction, providing ongoing connections to Fresno, Bakersfield, and Southern California.

To support train operations, the Project includes a new layover facility in Chico for storing trains and—pending further coordination with the host railroad, Union Pacific Railroad—a combination of infrastructure improvements and/or capital access fees to permit shared use of the existing freight rail corridor by passenger trains.

Preliminary capital cost estimates are on the order of \$500 million for capital costs (\$275 million if capital access fees are used in lieu of all corridor improvements outside of the proposed station and layover facility).

What are the benefits of the Proposed Project?

The Project would better connect the North Valley with the rest of Northern California and the larger statewide rail network, relieving traffic congestion on highways and reducing associated greenhouse gas emissions. By providing a new rail service in an underserved market, North Valley Rail would reduce reliance on personal automobiles, encourage more environmentally-sustainable travel choices, and support the region’s long-term growth and economic development. Low-income and historically disadvantaged communities in the North Valley would also benefit from improved access to housing, jobs, and education. The Project is forecasted to increase ridership across the combined future ACE and *San Joaquins* system by over 475,000 passengers annually in the initial years of service.

What is next for North Valley Rail?

A funding strategy using State funding sources has already been developed to move the Project into the environmental clearance and preliminary engineering phase shortly. During this phase, the project definition will be further refined and the potential environmental impacts of the Project will be evaluated. This will be followed by detailed design, permitting and right-of-way acquisition, procurement, and construction, with an expected service start in 2032, in time for the start of the initial high-speed rail service between Merced and Bakersfield.



Chapter 1

Introduction

This chapter briefly discusses the context for the Project and this Strategic Plan and provides a high-level overview of the Project and its key benefits. The final section describes the general organization of the plan by chapter.

- 1.1 Project Background
- 1.2 Project Overview
- 1.3 Project Benefits
- 1.4 Plan Structure

1.1 Project Background

The Project advances the recommendations of the Draft 2023 *California State Rail Plan* (CSRP) by extending passenger rail service north of the Sacramento area into the Northern Sacramento Valley (“North Valley”) to serve population centers in Yuba, Sutter, and Butte Counties. Currently, passenger rail service in these areas is only provided by the *Coast Starlight*, which only operates one daily roundtrip that stops only in Chico.⁽¹⁾ Outside of the *Coast Starlight*, intercity transit connections are currently provided primarily by Amtrak Thruway Bus Route 3, which connects with *San Joaquins* trains in Stockton, and privately-operated intercity buses (Greyhound and FlixBus).

This North Valley Passenger Rail Strategic Plan (“Strategic Plan”) defines the scope of the Project in detail and develops a blueprint for its implementation and eventual operation. Preparation of the Strategic Plan was led by the Butte County Association of Governments (BCAG), in a multi-agency partnership with the California Department of Transportation (“Caltrans”); the San Joaquin Regional Rail Commission (SJRRRC) and San Joaquin Joint Powers Authority (SJJPA), which manage Altamont Corridor Express (ACE) and the *San Joaquins* services, respectively; and Union Pacific Railroad (“UP” or “UPRR”), the owner of the rail corridor. Funding for this planning effort was provided through the Caltrans Sustainable Transportation Planning Grant Program (using Federal Transit Administration (FTA) Section 5304 (Statewide Planning) funds) and the Local Transportation Fund (LTF) derived from the general statewide sales tax.

Work on the Strategic Plan began in January 2022 and culminated with the publication of the Draft Report in December 2023, followed by the Final Report in May 2024. BCAG is now seeking to initiate work on environmental clearance and preliminary engineering for the Project.

1.2 Project Overview

The Project builds upon the Valley Rail Program’s Sacramento Extension, which will bring additional passenger rail service into the Sacramento area from the south via a new alignment through Midtown Sacramento, with a terminus in Natomas at Elkhorn Boulevard. The Project proposes to extend some of these trains further north from Natomas and into the North Valley, serving four new stations at Plumas Lake, Marysville–Yuba City, Gridley, and Chico. The target start date of service is sometime in 2032.

The proposed initial “starter” service includes four daily roundtrips tailored to the North Valley’s unique needs, connecting to multiple destinations within the Northern California Megaregion including Sacramento, Stockton, and the San Francisco Bay Area:

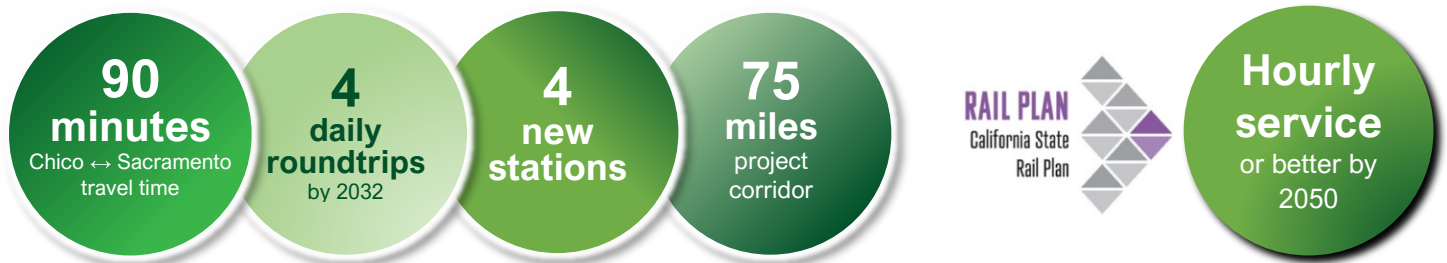
- Two of the roundtrips would provide direct, one-seat rides between the North Valley and high-speed rail (HSR), providing timed connections at the future HSR station in Downtown Merced and allowing for ongoing connections to Los Angeles and the rest of Southern California via the HSR Early Operating Segment (EOS) to/from Bakersfield.
- An additional third daily roundtrip would provide timed connections in Stockton for continuing travel to/from Merced and HSR, and to/from the San Francisco Bay Area.
- The fourth daily roundtrip would connect the North Valley with the Tri-Valley area and Southern Alameda County, terminating at ACE’s new planned terminal at Union City Intermodal Station, allowing for direct connections with BART and Transbay bus services.

(1) Refer to the *Coast Starlight* timetable provided in **Table 3-1** on page 19.

Two of the roundtrips would also be in slots that are well-positioned to serve the commuter and business/leisure day-trip market into Sacramento.

At the Gridley station, buses would provide convenient connections for passengers continuing to/from Oroville, the county seat of Butte County. Bus connections to/from Sacramento International Airport are also planned to be available at the Natomas station, consistent with the Valley Rail Program, allowing for seamless airport connections via public transit for North Valley residents and visitors. With an approximate travel time of 90 minutes between Chico and Sacramento, the service would also be competitive with private automobiles in the key shorter-distance travel market between the North Valley and Sacramento.

While the initial service plan focuses on four daily roundtrips, the Project lays the groundwork for potential future service expansion beyond the initial service. Stations and other infrastructure constructed as part of the Project will be the critical first step in achieving the long-term service goals envisioned in the Draft 2023 CSRP, which call for hourly service or better in the North Valley corridor by 2050. The Project will also build support for potential future extensions into the North State area (e.g., Red Bluff and Redding) and open up other potential avenues for exploration, such as direct service to Sacramento Valley Station, expanded commuter service into Sacramento, and interlining with the *Capitol Corridor*. Caltrans is currently leading a study to look at opportunities for direct service to Sacramento Valley Station and what might be required to enable this connection.



1.3 Project Benefits

The Project would improve transit connections for the underserved North Valley, by building upon planned future expansions of the statewide passenger rail network being implemented as part of or in conjunction with the Valley Rail Program. This would provide direct, one-seat rides to/from Sacramento (a major short-distance market) and other major rail hubs across the Northern California Megaregion. Linking North Valley communities to the Northern California Megaregion and the larger statewide rail network would provide major benefits by reducing traffic congestion, vehicle miles traveled (VMT), and greenhouse gas (GHG) emissions; expanding equity through improved access to housing, high-quality jobs, and higher education; and promoting economic development and tourism.

1.3.1 Expanded Rail Connectivity

By substantially expanding rail service in the North Valley beyond the existing once-daily *Coast Starlight*, the Project will provide an attractive and viable transit alternative in the corridor for a variety of trip purposes and ridership markets, including intercity travelers throughout the Northern California Megaregion; longer-distance intercity travelers to destinations throughout the State through connections to other services such as HSR; commuters and business travelers into Sacramento; and other passengers.

The Project is designed to seamlessly integrate and complement existing and planned future rail service, including the following major projects and service improvements being implemented as part of, or in conjunction with other rail expansion efforts as part of the Valley Rail Program:

- Sacramento Extension for ACE and the *San Joaquins*, from Stockton to Midtown Sacramento and Natomas
- Merced Extension for ACE, from Lathrop to Modesto, Turlock, and Merced
- Union City Extension for ACE, providing a direct connection to BART and Transbay buses
- Timed connections with the HSR EOS (Merced–Bakersfield) in Merced
- Expanded *San Joaquins* service with up to 12 daily roundtrips and the new Merced Intermodal Track Connection (MITC) project to bring *San Joaquins* trains directly to the new HSR station

1.3.2 Progress towards Housing and Climate Goals

The Project also supports the State’s housing and climate goals by providing an environmentally friendly and reliable transit-based travel option within the North Valley. Proposed stations are envisioned to become new transit hubs, creating opportunities for transit-oriented development (TOD) and downtown revitalization to bolster the state’s supply of transit-accessible housing. At the same time, the Project is anticipated to induce mode shifts and other changes in travel behavior, promoting independence from automobiles and fossil fuels, taking traffic off roads, and reducing VMT and GHG emissions.

Sites for the four planned stations—at Plumas Lake, Marysville–Yuba City, Gridley, and Chico—have been carefully selected to maximize connectivity and capitalize on local planning efforts:

- The proposed station in Plumas Lake would provide a new station to serve a growing community that is over 30 years in the making. The Plumas Lake Specific Plan, adopted in 1993 by Yuba County, calls for approximately 11,750 dwelling units and supporting retail and commercial uses at full build-out. The Project would connect Plumas Lake with Sacramento and the rest of the North Valley and also provide enhanced access to key destinations, including the Toyota Amphitheatre and the Hard Rock Hotel & Casino Sacramento at Fire Mountain.
- The proposed stations at Marysville–Yuba City⁽²⁾ and Gridley would be centrally located in historic downtowns, promoting opportunities for economic development and neighborhood revitalization. These station locations are also surrounded by multiple opportunity sites for TOD.
- The two potential station sites in Chico include one at the existing Amtrak station in Downtown Chico, within short walking distance of the Chico State campus, and another adjacent to Barber Yard, a major redevelopment site.

Based on preliminary ridership forecasts prepared as part of the Strategic Plan, the Project is expected to increase annual ridership for the expanded ACE and *San Joaquins* system by approximately 476,000 passengers in the initial years of service with four daily roundtrips. This is equivalent to an annual VMT reduction benefit of approximately 31.36 million VMT.

Building upon ACE’s pioneering milestone of being one of the first passenger rail services in Northern California to fully switch to renewable diesel operations, North Valley Rail is expected to be operated with an environmentally-friendly train fleet, in alignment with State goals to decarbonize rail and other transportation.

(2) Two potential sites are under consideration for the Marysville–Yuba City station, both of which would be located in Marysville’s historic downtown.

1.3.3 Greater Equity and Social Mobility

The Project focuses and advances equity and social mobility through transportation investments. As illustrated in **Figure 1-1**, large swaths of the Project alignment have been designated as California Climate Investments Priority Populations (Disadvantaged or Low-Income Communities) by the California Air Resources Board, and 3 of the 4 stations are directly located in such communities. These residents, and transit-dependent riders in general, would benefit from an environmentally-friendly regional and intercity transit solution that takes polluting cars off the road and improved access to employment, healthcare, and educational opportunities.

Prospective students across the Central Valley and state would benefit from better access to Chico State, Butte College, and other higher-education institutions along the expanded future ACE and *San Joaquins* networks including California State University, Sacramento and University of California, Davis. For example, Chico State's enrollment of over 13,000 students comes from all over California and would be able to take full advantage of the new passenger rail service:

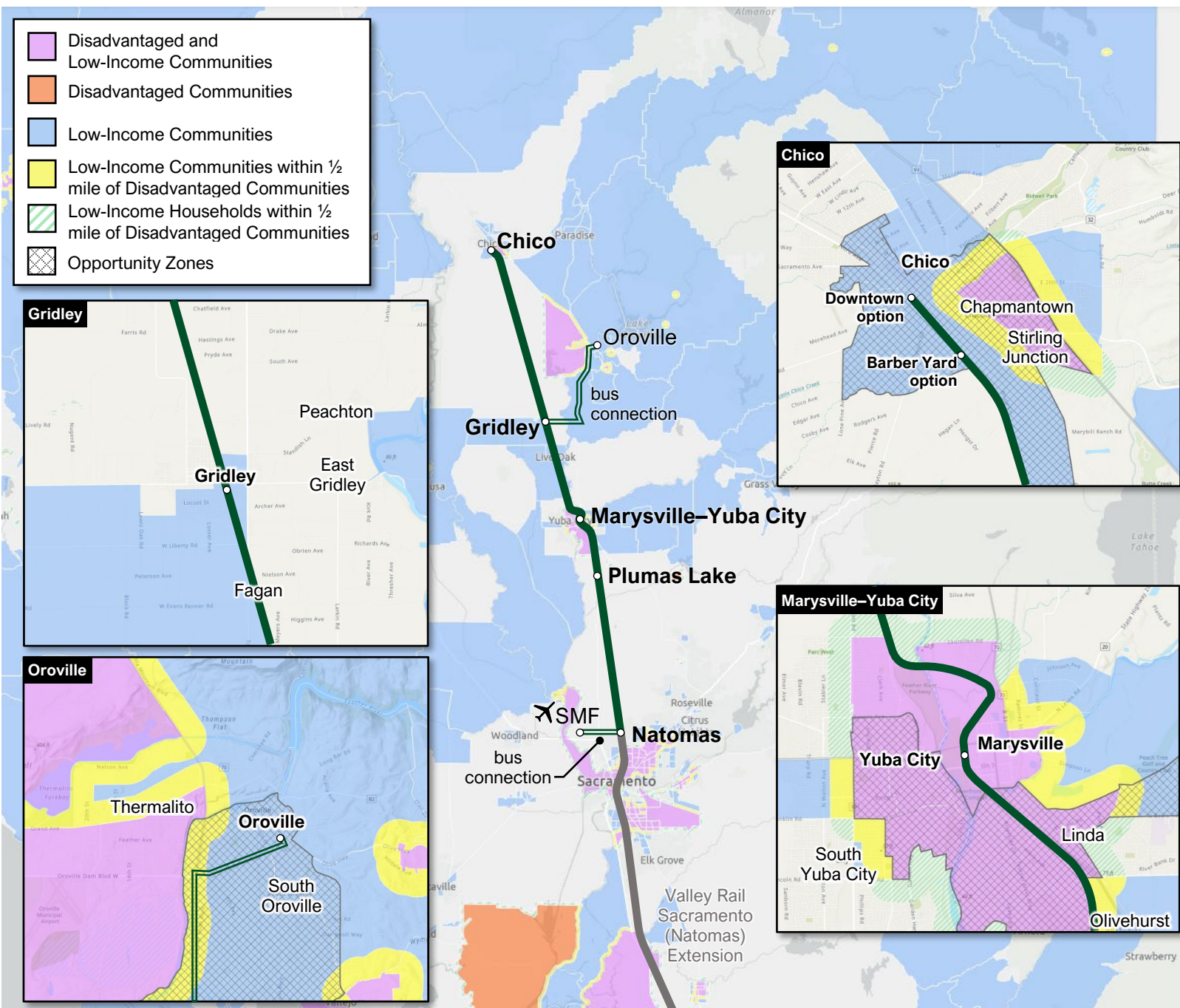
- 26.5% from Chico State's service area
- 10.3% from the Sacramento area
- 22.3% from the San Francisco Bay Area
- 20.9% from the Los Angeles area
- 17% from the rest of California
- 3% from out-of-state or international

1.4 Plan Structure

The Strategic Plan is organized into the following chapters:

- **Chapter 2: Community and Stakeholder Engagement**
- **Chapter 3: Service and Operations Planning**
- **Chapter 4: Infrastructure Improvements**
- **Chapter 5: Ridership Forecasts**
- **Chapter 6: Funding and Implementation Strategy**
- **Chapter 7: Fare Strategy**
- **Chapter 8: Conclusion and Next Steps**

Figure 1-1: Priority Populations (Disadvantaged and Low-Income Communities)



Source: Priority Populations base mapping from [California Air Resources Board](#). Annotations by AECOM.

Chapter 2

Community and Stakeholder Engagement

Development of the Strategic Plan was informed by a robust outreach effort targeted at the community at large and relevant stakeholders, with the intent of incorporating valuable input into project planning and development. The outreach process, including key engagement events and milestones, is described in this chapter.

- 2.1 Community Engagement
- 2.2 Other Stakeholder Engagement

2.1 Community Engagement

AIM Consulting led the Project Team's community engagement process which included a series of events to introduce the Project to the community and gather valuable input from community members. This included the creation of a stakeholder database of 173 unique contacts representing education, human services agencies, chambers of commerce, hospitals, transportation and environmental advocates, and more. This database was used to create an additional list of 29 community-based organizations representing priority populations within the counties, including low-income and disabled/elderly groups and minority communities (Native American, Hmong, Hispanic, and African-American).

Keystone community engagement events included the following:

- **Community Meeting #1** was held virtually via Zoom on Thursday, February 23, 2023 from 5:00 p.m. to 6:30 p.m. and included a presentation of the Project and the larger Valley Rail Program; train service planning and implementation; station, layover facility, and track improvements, and next steps. Total attendance at the community meeting was 127 people. The meeting included two live polls—one to ask where participants were from and if they had taken passenger rail before, and a second to ask what kinds of trips participants anticipated to take with the new service and where they anticipate going. The workshop ended with a question-and-answer ("Q&A") session.
- **Pop-up events** were held at the Bok Kai Festival in Marysville (Saturday, February 25, 2023) and Chico Certified Farmers Market (Saturday, March 4, 2023) to introduce community members to the Project and invite participation in the upcoming questionnaire.
- An **online questionnaire** was open April 1–May 15, 2023 to collect initial feedback on how community members anticipate using the proposed North Valley Passenger Rail, possible opportunities and challenges regarding the alignment and stations, and connections to the stations. At the end of the campaign, the questionnaire received 506 responses, with a 95% completion rate. The average user spent 2 minutes completing the questionnaire. Respondents envisioned themselves using the new rail service for a variety of trip purposes, including recreation/leisure (84 percent), non-commute business travel (32 percent), medical (24 percent), commute (18 percent), and school (5 percent). A summary report of the questionnaire results is provided in **Appendix A** for reference.
- **Community Meeting #2** was held virtually via Zoom on Wednesday, December 13, 2023 from 5:00 p.m. to 6:00 p.m. This meeting included a presentation to review work completed during the course of development of the Strategic Plan, along with key findings. Additionally, participants were notified that the draft Strategic Plan would be available for public review in January of 2024. Total attendance at the community meeting was 86 people. The workshop ended with a Q&A session.

The Project Team developed and continues to maintain a dedicated Project website at <https://northvalleyrail.org/> to disseminate Project information and updates, including notices regarding upcoming meetings and events.

In addition to workshop flyers and social media content, materials produced to support public outreach and engagement included an 8-page Project booklet and 2-page fact sheet distributed online through the Project website in Adobe Portable Document File (PDF) format, as well as press releases and other information shared with database contacts, community-based organizations, and various media outlets, including the following:

- **Newspapers:** *The Sacramento Bee*, *Chico News & Review*, *Chico Enterprise-Record*, *The Orion* (Chico State's independent student newspaper), *Oroville Mercury-Register*, *Paradise Post*, *The Appeal-Democrat* (Yuba–Sutter area), *Red Bluff Daily News*, and *Citrus Heights Sentinel*

- **Periodicals:** *Sacramento Business Journal*, *Sacramento Magazine*, *Sactown Magazine*, and *Comstock's magazine*
- **Online news outlets:** Action News Now, Chico State Today, and YubaNet
- **Television stations:** KCRA-TV (Channel 3), ABC10 (KXTV), CBS13 (KQVR), and FOX40 (KTXL) in the Sacramento area and ABC7 (KRCR) in the Chico–Redding area
- **Television programs:** GoodDay Sacramento (KMAX-TV / Channel 31)
- **Radio stations:** KCSC Radio (Chico State's student-run radio station)

2.2 Other Stakeholder Engagement

The Strategic Plan was developed by BCAG in partnership with Caltrans, SJRRC, SJJPA, and UP. BCAG and its consultants met regularly with SJRRC, SJJPA, and Caltrans representatives throughout the planning effort. The Strategic Plan was also developed in coordination with other key stakeholders and decisionmakers along the Project route, including the following:

- Metropolitan planning organizations (MPOs) including the Sacramento Area Council of Governments (SACOG)
- Local counties and municipalities including the Counties of Butte and Yuba; the Cities of Chico, Oroville, Biggs, Gridley, Marysville, and Yuba City; and the Town of Paradise
- Transit agencies including Butte Regional Transit ("B-Line"), Yuba–Sutter Transit, and Shasta Regional Transportation Agency (SRTA)
- Chico State
- Central Valley Rail Working Group (CVRWG)

The primary method to engage these stakeholders was through the Project Development Team (PDT), which was established at the outset of the Project. Meetings of the PDT have taken place periodically to provide project updates and to allow for input from stakeholders. To-date, a total of 5 PDT meetings have taken place:

- PDT #1: Thursday, March 24, 2022 3:00–4:30 p.m.
- PDT #2: Thursday, December 15, 2022 9:00–10:30 a.m.
- PDT #3: Thursday, April 27, 2023 1:00–2:30 p.m.
- PDT #4: Tuesday, August 22, 2023 10:30 a.m.–12:00 p.m.
- PDT #5: Tuesday, December 5, 2023 1:00–2:30 p.m.

The PDT will continue during the environmental clearance phase of the Project.

In addition, numerous individual meetings and site walks were conducted with stakeholders along the corridor to gain an understanding of specific issues. This work will continue throughout the entire project development process.

NORTH VALLEY RAILCHICO • GRIDLEY • MARYSVILLE/YUBA CITY
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Would you ride a train between Chico and Sacramento, and beyond?

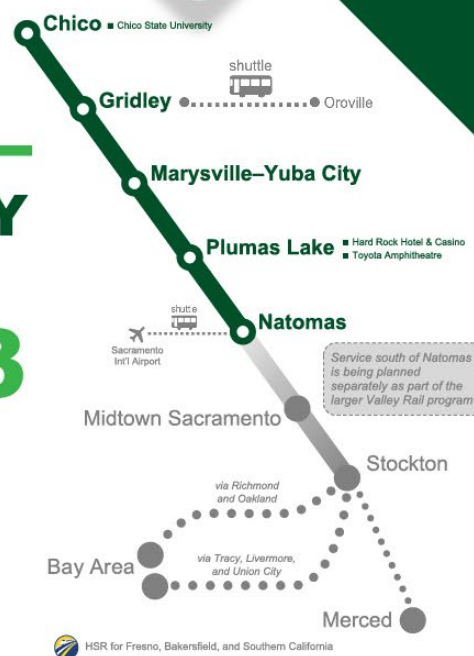


Join us for a discussion about creating a passenger rail service between Sacramento and Chico, and beyond.

VIRTUAL COMMUNITY WORKSHOP: FEBRUARY 23

5:00 PM via Zoom

RSVP: bit.ly/NorthValleyRailMeeting



Learn more about the North Valley Passenger Rail Strategic Plan: bit.ly/NorthValleyPassengerRail

Chapter 3

Service and Operations Planning

The initial technical task in development of the Strategic Plan involved a comprehensive planning effort to define the proposed rail service and operations. This includes researching and establishing the background context of existing transit services in the North Valley, developing and defining the critical Project attributes (route, station and layover facility locations, rolling stock, and service levels), exploring potential opportunities for improved bus connections, and estimating the operating costs for the proposed service. This technical work is described in detail in this chapter.

- **3.1 Existing Transit Services**
- **3.2 Proposed Route Alignment**
- **3.3 Proposed Stations**
- **3.4 Proposed Service Plan**
- **3.5 Rolling Stock**
- **3.6 Proposed Layover Facility**
- **3.7 Bus Connections**
- **3.8 Estimated Operations and Maintenance Costs**

3.1 Existing Transit Services

Currently, there are three major transit options available to passengers in the North Valley corridor: long-distance intercity rail (the *Coast Starlight*), intercity bus (Greyhound and FlixBus), and commuter buses (Yuba–Sutter Transit). Amtrak Thruway bus service (Route 3), which connects with *San Joaquins* trains in Stockton, also serves the North Valley corridor but currently requires that passengers purchase a connecting *San Joaquins* train ticket. These services are described in more detail below (reflecting conditions as of July 2023, unless otherwise noted).

3.1.1 Coast Starlight

Amtrak's *Coast Starlight* is a long-distance intercity service connecting Seattle, Portland, Sacramento, the San Francisco Bay Area, and Southern California (Los Angeles). Within the North Valley, only Chico is served, with the next nearest stations being Redding to the north and Sacramento Valley Station to the south. Service is one roundtrip daily, and travel between Chico and Sacramento is only available in the late evening or early morning. An abridged timetable for the *Coast Starlight* showing all stations in the North Valley and other key stations is provided in **Table 3-1**.

Table 3-1: Coast Starlight Timetable

Southbound <i>Coast Starlight</i> #11	(read down)	Station	(read up)	Northbound <i>Coast Starlight</i> #14
9:50	▼	Seattle (King Street)	SEA ▲	19:51
13:50	▼	Portland (Union)	PDX ▲	15:56
14:22	▼		▲	15:40
4:12	▼	Chico	CIC ▲	1:37
4:12	▼		▲	1:37
6:28	▼	Sacramento (Sacramento Valley)	SAC ▲	23:49
6:48	▼		▲	23:49
8:29	▼	Emeryville	EMY ▲	21:41
8:39	▼		▲	21:31
8:54	▼	Oakland (Jack London Square)	OKJ ▲	21:21
9:09	▼		▲	21:06
10:14	▼	San Jose (Diridon)	SJC ▲	19:58
10:26	▼		▲	19:46
21:11	▼	Los Angeles (Union)	LAX ▲	9:51

Source: AECOM.

Notes:

Not all stations north of Chico and south of Sacramento (Sacramento Valley) are shown.

Arrival and departure timepoints are shown separately for intermediate stations.

3.1.2 Intercity Bus

Intercity bus service in the North Valley corridor is available through Greyhound and FlixBus (which acquired Greyhound in 2021). While the two companies are branded differently, passengers can book both Greyhound and FlixBus tickets through either company's website. Service in the North Valley consists of one daily Greyhound roundtrip between Seattle and Sacramento and one FlixBus roundtrip between Portland and Sacramento. An abridged timetable for intercity buses showing all stops in the North Valley and other key stops is provided in **Table 3-2**.

As shown in **Table 3-2**, intercity buses generally offer slightly better timepoints than the *Coast Starlight* for North Valley passengers, particularly for travel to and from Sacramento. With two roundtrips available, passengers also have some flexibility to choose between morning or evening trips. It should be noted, however, that neither of the buses currently (as of November 2023) appears to serve Marysville, although a review of some past timetables showed stops there for both operators. In addition, at least some past timetables for FlixBus also did not include a stop in Chico. In general, it is likely that service is frequently modified as needed to tailor the service to travel patterns (e.g., school-related travel), including the addition/removal of stops and adjustments to timepoints.

Table 3-2: Intercity Bus Timetable

Southbound		(read down)	Stop	(read up)	Northbound	
FlixBus	Greyhound				Greyhound	FlixBus
—	6:00	▼	Seattle	▲	3:55	—
—	10:25	▼	Portland	▲	23:30	—
19:25	11:25	▼		▲	22:45	9:05
4:35	20:55	▼	Redding	▲	13:00	00:05
4:40	21:25	▼		▲	12:20	00:05
5:15	22:00	▼	Red Bluff	▲	11:45	23:35
5:15	22:00	▼		▲	11:45	23:35
6:10	22:55	▼	Chico	▲	10:45	22:40
6:15	23:00	▼		▲	10:40	22:35
6:50	23:35	▼	Oroville	▲	10:10	22:05
6:50	23:40	▼		▲	10:05	22:05
↓	↓	▼	Marysville	▲	↑	↑
↓	↓	▼		▲	↑	↑
8:10	1:00	▼	Sacramento (Greyhound Bus Station)	▲	8:45	20:45
8:20	—	▼		▲	—	20:35
8:30	—	▼	Old Sacramento (2nd Street/J Street)	▲	—	20:25

Source: AECOM.

Notes:

Minor stops north of Redding not shown.

Arrival and departure timepoints are shown separately for intermediate stations.

3.1.3 Commuter Bus

Yuba–Sutter Transit offers frequent commuter bus service connecting Yuba and Sutter Counties with Sacramento, but only on weekdays. Service is provided along two main routes: Route 99 serving Yuba City and Bogue via State Route (SR) 99 west of the Feather River, and Route 70 serving Marysville, Olivehurst, and Plumas Lake via SR 70 east of the Feather River. However, some trips traveling via SR 99 also serve Marysville, while some trips traveling via SR 70 also serve Yuba City. A limited number of trips allow for reverse-direction travel (e.g., morning buses arriving inbound in Sacramento can pick up passengers in Sacramento heading outbound).

Service post-COVID consisted of 7 commute-period roundtrips (4 via Route 99 and 3 via Route 70) and 3 midday roundtrips. An additional 3 commute-period roundtrips (1 via Route 99 and 2 via Route 70) were in operation prior to COVID-19, but had been suspended until further notice since May 1, 2020. Starting November 1, 2023, service changes went into effect, formalizing a reduced post-COVID service level of 6 commute-period roundtrips

(3 each via Route 99 and via Route 70) and 2 midday roundtrips (via Route 70). This new timetable for Yuba–Sutter Transit commuter buses is provided in **Table 3-3**.

Table 3-3: Commuter Bus Timetable

Stop		Morning Commuter						Midday		Afternoon Commuter					
		170	199	270	299	370	399	1 MD	2 MD	199	170	270	299	370	399
Walton Terminal (Sunsweet)	Yuba City	—	—	—	—	—	—	7:50	11:10	—	—	—	—	—	—
Caltrans District Office	Marysville	—	—	—	—	—	—	—	—	—	—	—	—	16:10	—
Yuba County Government Center	Marysville	5:25	—	5:55	6:05	6:40	—	7:55	11:15	14:40	—	—	—	—	16:30
Walton Terminal (Sam's Club)	Yuba City	—	5:30	—	6:15	—	6:45	—	—	—	—	—	—	—	—
McGowan Pkwy. Park & Ride (SR 70)	Olivehurst	5:35	—	6:05	—	6:50	—	8:05	11:25	—	—	—	—	—	—
Plumas Lake Park & Ride (SR 70)	Plumas Lake	5:42	—	6:15	—	7:02	—	8:15	11:35	—	—	—	—	—	—
Bogue Road Park & Ride (SR 99)	Bogue	—	5:40	—	6:25	—	6:55	—	—	—	—	—	—	—	—
Natomas Gateway Center	Sacramento	—	—	—	—	—	—	—	—	—	—	—	—	16:55	—
J St. & 4th St.	Sacramento	6:15	6:20	6:50	7:05	7:40	7:38	8:50	12:05	15:30	15:35	16:05	16:30	17:05	17:25
J St. & 8th St.	Sacramento	6:16	6:21	6:52	7:07	7:42	7:40	8:52	12:07	15:32	15:37	16:07	16:32	17:08	17:28
J St. & 11th St.	Sacramento	6:17	6:22	6:54	7:09	7:44	7:42	8:54	12:09	15:34	15:39	16:09	16:34	17:10	17:30
15th St. & K St.	Sacramento	6:20	6:25	6:57	7:12	7:47	7:45	8:57	12:12	15:37	15:42	16:12	16:37	17:15	17:35
15th St. & N St.	Sacramento	6:21	6:26	6:58	7:13	7:48	7:46	8:58	12:13	15:38	15:43	16:13	16:38	17:16	17:37
P St. & 13th St.	Sacramento	6:23	6:28	7:00	7:15	7:50	7:48	9:00	12:15	15:40	15:45	16:15	16:40	17:20	17:41
P St. & 9th St.	Sacramento	6:24	6:29	7:02	7:17	7:52	7:50	9:02	12:17	15:42	15:47	16:17	16:42	17:22	17:43
P St. & 5th St.	Sacramento	6:25	6:30	7:05	7:20	7:55	7:53	9:05	12:20	15:45	15:50	16:20	16:45	17:25	17:45
Natomas Gateway Center	Sacramento	6:32	—	—	—	—	—	Midday routes provide return service to all park and ride lots upon drop-off request to driver.	—	—	—	—	—	—	—
Bogue Road Park & Ride (SR 99)	Sacramento	—	—	—	—	—	—		16:25	—	—	17:30	—	18:30	—
Walton Terminal (Sunsweet)	Yuba City	—	—	—	—	—	—		16:40	—	—	17:45	—	18:45	—
Yuba County Government Center	Marysville	—	—	—	—	—	—		16:50	—	—	17:55	—	18:55	—
Plumas Lake Park & Ride (SR 70)	Plumas Lake	—	—	—	—	—	—		—	16:25	16:55	—	18:05	—	—
McGowan Pkwy. Park & Ride (SR 70)	Olivehurst	—	—	—	—	—	—		—	16:40	17:10	—	18:20	—	—
Caltrans District Office	Marysville	7:20	—	—	—	8:45	—		—	—	—	—	—	—	—
Yuba County Government Center	Marysville	7:25	—	—	—	8:50	—		—	16:55	17:25	—	18:30	—	—
Walton Terminal (Sam's Club)	Yuba City	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Source: Yuba–Sutter Transit.

Notes:

Shading indicates drop-off only stop.

3.1.4 Amtrak San Joaquins Thruway Bus

In addition to the above three options, Thruway Route 3 also operates through the North Valley corridor, providing timed connections at Stockton San Joaquin Street station with Oakland-branch *San Joaquins* trains for continuing journeys south of Stockton. Stops are provided in Redding, Red Bluff, Chico, Oroville, Marysville, Sacramento, Elk Grove, and Stockton.

The current Thruway Route 3 timetable (as of January 2024) is summarized in **Table 3-4**. As shown in **Table 3-4**, Route 3 operates three daily roundtrips, two of which extend beyond Chico and serve Red Bluff and Redding. When the *San Joaquins* operated seven daily roundtrips prior to the COVID-19 pandemic, Route 3 operated four daily roundtrips, all of which extended as far north as Redding.

Because Route 3 is not currently eligible for bus-only travel, passengers must currently purchase a connecting train ticket in order to use Route 3 for travel within the North Valley corridor. Bus-only ticketing for Route 3 would

allow for travel within the North Valley corridor and is currently being contemplated as part of future ticketing changes for the service.

Table 3-4: Amtrak Thruway Bus Timetable

Southbound			(read down)	Stop		(read up)	Northbound		
3712	3716	3718					3711	3713	3715
6:05	10:05		▼	Redding (RABA Downtown Transit Center)	RDR	▲		17:45	21:35
6:40	10:40		▼	Red Bluff (TRAX Bus & Ride)	RBF	▲		17:15	21:05
7:45	11:45	15:35	▼	Chico	CIC	▲	11:55	16:20	20:10
8:10	12:10	16:00	▼	Oroville (Harbor Freight Tools)	ORV	▲	11:25	15:50	19:40
8:45	12:45	16:35	▼	Marysville (Yuba County Gov't. Center)	MRV	▲	10:50	15:15	19:05
9:50	13:50	17:50	▼	Sacramento Valley	SAC	▲	10:00	14:25	18:15
10:05	14:05	18:05	▼		SAC	▲	9:50	14:00	18:00
—	—	—	▼	State Capitol	SCS	▲	9:35	13:50	17:50
10:20	14:20	18:20	▼	Elk Grove (9180 Harbour Point Drive)	EKG	▲	—	13:35	17:35
—	—	19:00	▼	Downtown Stockton	SKT	▲	—	—	—
11:05	15:10	19:10	▼	Stockton San Joaquin Street	SKN	▲	8:45	12:45	16:45
↓	↓	↓					↑	↑	↑
11:23	15:23	19:23	▼	Stockton San Joaquin Street	SKN	▲	8:36	12:36	16:36
11:56	15:56	19:56	▼	Modesto	MOD	▲	8:03	12:03	16:03
12:12	16:09	20:09	▼	Turlock–Denair	TRK	▲	7:45	11:45	15:45
12:45	16:45	20:45	▼	Merced	MCD	▲	7:23	11:23	15:23
13:19	17:19	21:19	▼	Madera	MDR	▲	6:38	10:42	14:42
13:49	17:49	21:49	▼	Fresno	FNO	▲	6:12	10:16	14:16
14:24	18:24	22:24	▼	Hanford	HNF	▲	5:34	9:34	13:39
14:40	18:40	22:40	▼	Corcoran	COC	▲	5:14	9:14	13:19
15:17	19:17	23:12	▼	Wasco	WAC	▲	4:39	8:39	12:39
15:57	19:57	23:57	▼	Bakersfield	BFD	▲	4:12	8:12	12:12
712	716	718					711	713	715

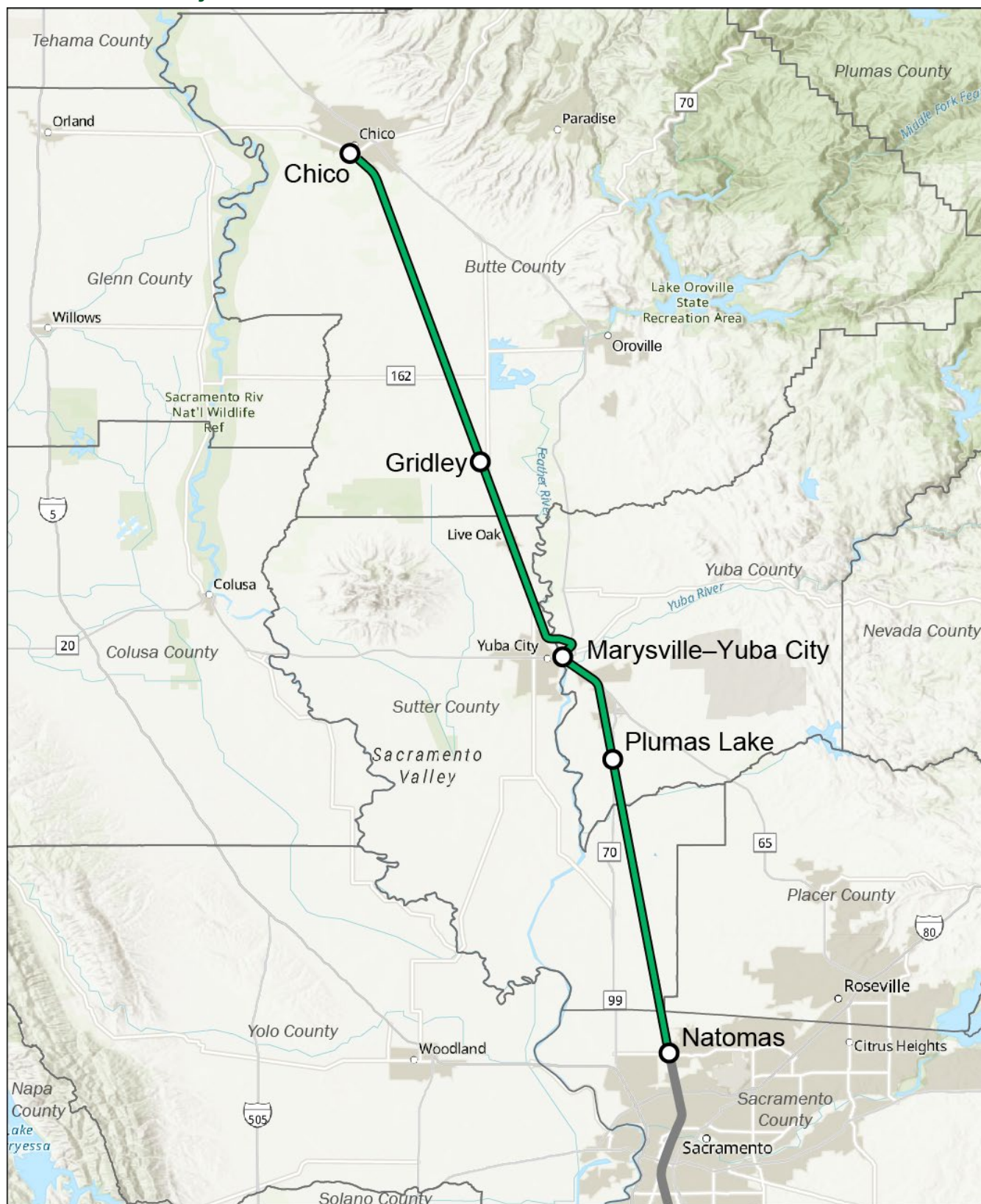
Source: SJJPA.

Notes:

Arrival and departure timepoints are shown separately for Sacramento Valley Station.

3.2 Proposed Route Alignment

A map of the proposed North Valley Rail route and stations is shown in **Figure 3-1**.

Figure 3-1: North Valley Rail Route

Source: AECOM.

Base map by Esri, HERE, Garmin, FAO, NOAA, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap, OpenStreetMap contributor, and the GIS User Community.

From the planned Natomas Station (part of the Valley Rail Program’s Sacramento Extension), the proposed route extends north, following the UP Sacramento Subdivision⁽³⁾ to Marysville. At Binney Junction immediately north of Marysville, the route diverges from the UP Sacramento Subdivision and follows the UP Valley Subdivision to Chico.

In addition to the proposed route to Chico, an “Alternate Route” to Oroville was also considered in the initial planning stages, continuing along the UP Sacramento Subdivision north of Binney Junction to Oroville instead of diverging to the UP Valley Subdivision. The Alternate Route was eventually dropped from further consideration because the population distribution and travel markets within Butte County suggested higher ridership potential for Chico compared to Oroville. This includes a consideration of total population (which is higher for Chico than for Oroville), and the presence of Chico State as the largest key destination in Butte County. Selecting the Alternate Route would also preclude future extension of passenger rail service north of Chico to Red Bluff and Redding, as currently envisioned in the Long-Term Horizon (by 2050) under the Draft 2023 CSRP.

3.3 Proposed Stations

Proposed stations were initially identified based on the location of key population and employment centers, the potential to capture important ridership markets to support the new service, and input from State, regional, and local agencies. As shown in **Figure 3-1**, the following four stations are proposed⁽⁴⁾:

- Plumas Lake
- Marysville (also serving Yuba City)
- Gridley
- Chico

Specific sites for proposed stations were identified through an initial screening analysis, generally focusing on locations that offer the highest potential to capture ridership:

- Sites located in or near communities within the rail corridor with relatively high existing or projected households/populations
- Sites that offer good transit and active transportation connections to key local and regional destinations
- Sites that provide enough space to offer opportunities for expanded station amenities (e.g., bus bays, pick-up/drop-off areas, parking, etc.)
- Sites that provide opportunities for neighborhood revitalization (e.g., historic downtowns) and for transit-oriented development (or redevelopment), either within the station site footprint or in the surrounding areas

(3) A “division” is a management unit within a railroad, typically encompassing a specific portion of the railroad’s network and falling under the purview of a designated superintendent who is responsible for the day-to-day management and operations of the division. A “subdivision” is a portion of a division, typically designated between specific terminals or key points on the railroad for the purposes of staffing (e.g., changing crews) or, historically, equipment (e.g., changing locomotives). UP’s Sacramento Subdivision, for example, was originally part of the Western Pacific Railroad’s Feather River Route and runs between Oroville Yard in the north (where it continues as UP’s Canyon Subdivision) and El Pinal in Stockton (where it joins UP’s Fresno Subdivision).

(4) The station in Natomas is being planned separately as part of the Valley Rail Program’s Sacramento Extension and is not a “new” station specific to the Project (i.e., North Valley Rail). The Project would, however, include modifications to the planned station at Natomas to allow the station to function as a “through” station. These improvements are described in more detail in **Section 4.1.6**.

Additional consideration was also given to station sites located in the primary direction of travel. In the case of North Valley Rail, for example, a substantial share of passengers, particularly among commuters, are expected to head south on the outbound leg of their journey and north on the return leg. Therefore, stations located on or near the southern edge of communities along the route can offer some advantages in capturing these riders.

Once a shortlist of one or more potential station sites was identified based on the criteria above, additional consideration was given to other important criteria, such as design standards and requirements, location of potential layover facilities, and general engineering feasibility.

Specific locations for proposed stations are summarized in **Table 3-5** and discussed in further detail in the following subsections.

Table 3-5: Proposed Station Locations

Station	Location	Subdivision	Approximate milepost (MP)	Approximate distance from Natomas (miles)
Plumas Lake	North of Plumas Lake Blvd.	UP Sacramento	170.0	24
Marysville– Yuba City (2 options)	Downtown Marysville (between 5th St. and 10th St.)	UP Sacramento	178.9	33
	Downtown Marysville (south of 3rd St.)	UP Sacramento	178.5	33
Gridley	Downtown (south of Laurel St.)	UP Valley	157.7	50
Chico (2 options)	Barber Yard (development site)	UP Valley	183.3	75
	Downtown (existing Amtrak station)	UP Valley	184.1	76

Source: AECOM.

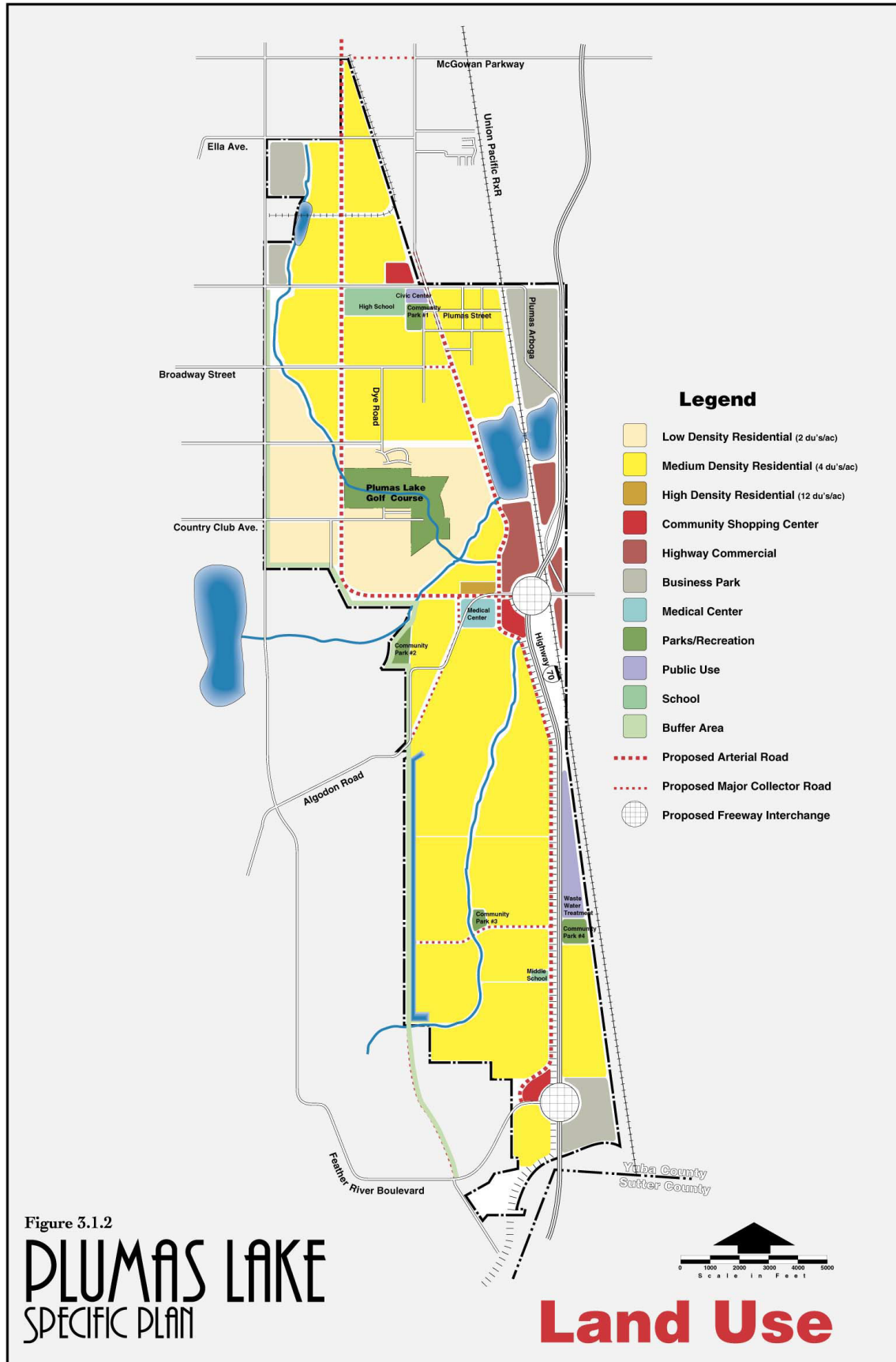
3.3.1 Plumas Lake

Plumas Lake is the first large community along the route north of Natomas and the first large community after entering Yuba County from the south. It is a master-planned development covering over 5,200 acres in unincorporated Yuba County, roughly spanning the area west of SR 70 between Olivehurst and Yuba County limits (i.e., the Bear River). Plumas Lake functions as a suburb of Yuba County's primary population center (Marysville) and as an exurb of Sacramento, which is located only 30 miles away and is well within commuting distance.

Build-out of the community is guided by the Plumas Lake Specific Plan, which was adopted in 1993 and calls for a total of approximately 11,750 dwelling units, primarily in medium- and low-density neighborhoods. The Specific Plan also includes a commercial cluster with a community shopping center and other commercial uses at the Plumas Lake Boulevard interchange. The Specific Plan's land use plan is illustrated in **Figure 3-2**.

According to U.S. Census Bureau data from the 2020 Census, the Plumas Lake census-designated place (CDP) currently has a population of 8,126 people spread across 2,305 households, with a total of 2,477 housing units and an employment rate of 66.7 percent. As part of the latest update to the Housing Element of its General Plan, Yuba County has also identified future changes to the Plumas Lake Specific Plan that will allow for high-density multi-family residential uses throughout the Specific Plan Area, which may allow for additional development capacity beyond what was originally allowed under the original Specific Plan adopted in 1993.

Figure 3-2: Plumas Lake Land Use Plan



Source: *Plumas Lake Specific Plan* (October 1992).

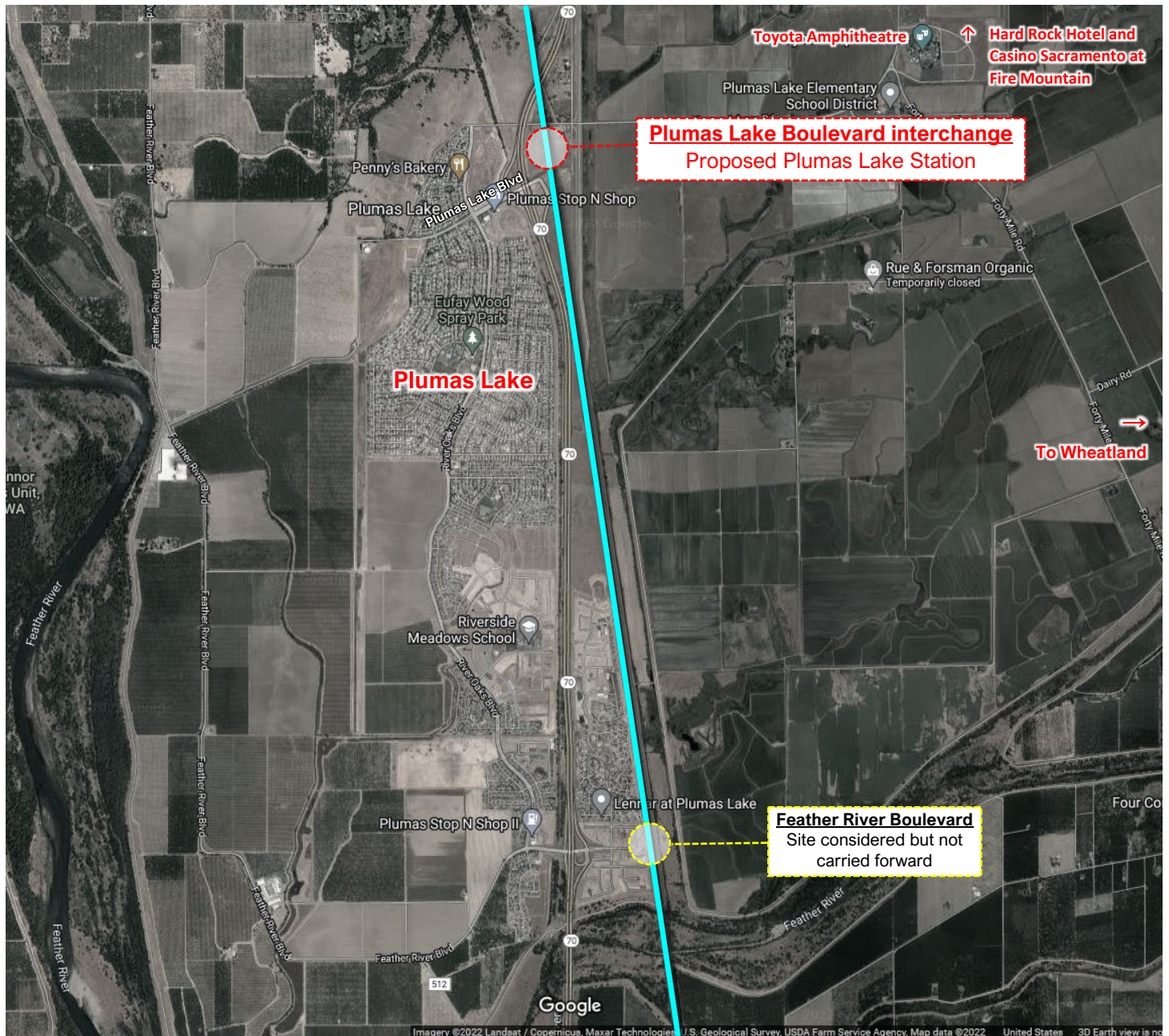
A station in Plumas Lake would also serve two key destinations located within a few miles of the station along Plumas–Arboga Road: the Toyota Amphitheatre (an outdoor concert venue with capacity for up to 18,500) and the Hard Rock Hotel & Casino. The city of Wheatland, with a population of 3,712, is also located due east of Plumas Lake, approximately 10 miles away (distance by road).

A Plumas Lake station would also capture potential markets from neighboring areas to the north that, due to their location south of the Yuba River, would require “backtracking” to/from the Marysville station. Several of these communities have sizeable populations, including Linda (21,654) and Olivehurst (16,595). Commuters and other time-sensitive riders originating in these areas would generally prefer a station located *en route* to their ultimate destination to avoid time loss while backtracking north to Marysville. The proposed Plumas Lake Station location near the SR 70 corridor would be ideally located to capture these riders. The existing park-and-ride facility at the very southern end of Plumas Lake at the Feather River Boulevard interchange, which is used by Yuba–Sutter Transit commuter buses, indicates there is already a strong commuter market in Plumas Lake.

As shown in **Figure 3-3**, the proposed station location is immediately adjacent to the Plumas Lake Boulevard interchange on vacant, undeveloped land immediately west of the UP right-of-way (ROW). A total of two different potential sites were evaluated for the station:

- Plumas Lake Boulevard interchange.** This site would be located on vacant, undeveloped land on the northeast quadrant of the SR 70/Plumas Lake Boulevard interchange. This site is on county-owned land, with ample space for expanded station amenities and opportunities for placemaking and transit-oriented development. The site is also centrally-located within Plumas Lake (at master plan full build-out), as shown in **Figure 3-2**, and the proximity to the freeway provides good access to/from neighboring communities. While residents living south of Plumas Lake Boulevard would need to back-track some distance if heading south via the train, the associated travel time would be under 5 minutes for the vast majority of those residents and would max out at about 8 minutes for residents in the southernmost portion of Plumas Lake. This travel time loss is also balanced out by being closer to the communities to the north mentioned above, as well as closer to the regional entertainment venues to the east.
- Feather River Boulevard.** This site would be located at the east end of Feather River Boulevard, at the intersection with the UP ROW. This site is close to the existing park-and-ride facility and is located at the southern end of Plumas Lake, placing it in the direction of travel for the majority of passengers and avoiding potential backtracking. This portion of Plumas Lake is currently partially developed, with roads already constructed and individual residential lots currently under construction. A station at this location is space-constrained, between residential development and the railroad ROW. Additionally, there is an existing electrical utility corridor and recently-completed recreational trail along the eastern edge of Plumas Lake at the site. As such, opportunities for expanded station amenities and placemaking may be more limited than at the Plumas Lake Boulevard interchange. This site is also much further from the Toyota Amphitheater and Hard Rock Hotel & Casino, as well as from Wheatland and the various communities north of Plumas Lake mentioned earlier.

Based on these considerations, the site at the Plumas Lake Boulevard interchange was selected as the preferred location to be carried forward for further analysis.

Figure 3-3: Plumas Lake Station Sites

Source: Google Earth. Annotations by AECOM.

Aerial imagery from Landsat/Copernicus, Maxar Technologies, USGS, USDA Farm Service Agency.

3.3.2 Marysville–Yuba City

Marysville is the county seat of Yuba County and its primary population center. A station at this location would serve both Marysville and its larger counterpart to the west across the Feather River, Yuba City, which is the county seat and primary population center of Sutter County. According to U.S. Census Bureau data from the 2020 Census, the cities of Marysville and Yuba City currently have populations of 12,467 and 70,117, respectively. The U.S. Census Bureau considers the Yuba City Metropolitan Statistical Area (MSA), which consists of Yuba and Sutter counties, as part of the larger Sacramento Combined Statistical Area (CSA), and there is significant commuter activity between the Yuba City MSA and the Sacramento–Roseville–Folsom MSA (Sacramento, Yolo, Placer, and El Dorado counties).

Marysville previously had an Amtrak station on the *Coast Starlight* service along the former Southern Pacific Railroad's Shasta Route (San Francisco/Oakland–Portland). That station was located at 6th Street along what is now the UP Valley Subdivision, the eastern UP alignment through the city.

As shown in **Figure 3-4**, the proposed station location is between 5th Street and 10th Street. A total of three different potential sites were evaluated for the Marysville–Yuba City Station:

Figure 3-4: Marysville–Yuba City Station Sites



Source: Google Earth. Annotations by AECOM.

Aerial imagery from Maxar Technologies, USGS, USDA Farm Service Agency.

- **Between 5th Street and 10th Street.** This site is centrally located in Downtown Marysville along a stretch of tangent track adjacent to an existing underutilized shopping center and near the Yuba County Government Center. This site offers the possibility to provide a full-amenity station (e.g., bus station, parking, etc.) accompanied by significant transit-oriented development and opportunities for placemaking

and neighborhood revitalization. The site also has very good access to/from Yuba City, with access via both 5th Street (Twin Cities Memorial Bridge) and 10th Street (Colusa Avenue).

- **Between 14th Street and Binney Junction.** This site is located on a section of tangent track on the northern outskirts of Downtown Marysville. Similar to the site south of 5th Street, this site has some physical constraints that generally make it less ideal for a station. Access may also require more in-depth consideration, as a significant portion of the eastern edge of the ROW consists of already-improved properties with existing buildings and facilities. Due to the proximity to Binney Junction (the intersection of the UP Sacramento Subdivision and UP Valley Subdivision), this location may not have sufficient space to accommodate the station platform and turnouts.
- **South of 5th Street.** This site is just south of the city's historic Western Pacific Railroad depot, which is located between 4th Street and 5th Street. Because the depot is located on a curve, this site was originally not considered in discussions with the City of Marysville, as there is only approximately 1,300 feet of distance available between the south end of the curve and the single-track truss bridge over the Yuba River. However, subsequent optimization of the trainset length as part of the ridership modeling (see **Section 5.3**) reduced the required length of tangent track for stations and made this site a potential option. Access (via J Street/3rd Street) may require further coordination but is generally good, and there is sufficient vacant and/or underutilized industrial land available south of the buildings along 3rd Street to accommodate ancillary station facilities such as parking.

Based on these considerations, two sites—the site between 5th Street and 10th Street and the site south of 3rd Street—were selected to be carried forward for further analysis as the North Option and South Option, respectively. In particular, the South Option avoids some potentially substantial issues associated with the North Option, which include a large elevation difference between the track and adjacent ground; a greater potential for levee impacts; and limited parking availability without impacting existing businesses. Station access under the North Option is also complicated by the need for passengers to cross a public street (Featherside Way) running adjacent to the UP ROW in order to enter/exit the station.

3.3.3 Gridley

The proposed Gridley Station is primarily intended to serve passengers heading to/from Oroville (the county seat of Butte County), as well as passengers in Gridley and nearby surrounding communities. According to U.S. Census Bureau data from the 2020 Census, Gridley currently has a population of 7,421 and is formally the third largest city in Butte County after Chico (101,475) and Oroville (20,042), although this is largely due to the 2018 Camp Fire and the resulting damage and displacement in Paradise and surrounding communities.

As shown in **Figure 3-5**, the proposed station location is in Downtown Gridley south of Laurel Street. A total of two different potential sites were evaluated for the station:

- **Downtown site.** This site would be located near the city's historic center, immediately south of Laurel Street (to avoid closure or blockage of street crossings). The site's central location provides good station access for all parts of the city and offers substantial opportunities for neighborhood revitalization and transit-oriented development in the surrounding blocks. East Gridley Road also provides convenient access for passengers heading to/from Oroville and neighboring communities.
- **FEMA site.** Under this option, the station would be located on the Gridley Industrial Park site, which was previously used by the Federal Emergency Management Agency (FEMA) as temporary housing for victims of the 2018 Camp Fire. As the site is at the southern edge of the city, within an area that is only lightly developed (primarily with light industrial or agricultural use), additional consideration would need

to be given to station access and connectivity. An integrated redevelopment of the entire site, however, offers substantial opportunities for transit-oriented development.

Given these considerations, the Downtown Gridley site was selected as the preferred location to be carried forward for further analysis.

Figure 3-5: Gridley Station Sites



Source: Google Earth. Annotations by AECOM.
Aerial imagery from Maxar Technologies, USGS, USDA Farm Service Agency.

3.3.4 Chico

Chico is the primary population center of Butte County and home to Chico State University. With a typical fall-semester enrollment of over 17,000 students, Chico State is the second largest small-metro campus⁽⁵⁾ in the California State University (CSU) system after the San Luis Obispo campus. According to U.S. Census Bureau data from the 2020 Census, the city itself currently has a population of 101,475, and is in close proximity to several other unincorporated communities with sizeable populations, including Magalia (7,795), Paradise (4,764), and Durham (5,834).

Two potential sites for a Chico station have been identified and are shown in **Figure 3-6**:

- **Downtown (existing Amtrak station).** The existing Chico Amtrak station is served by the *Coast Starlight* route (Los Angeles–Seattle) and is located in Downtown Chico between West 3rd Street and West 5th Street. This location is within short walking distance of the Chico State campus and other destinations in Downtown Chico, making it ideal in terms of capturing the largest potential ridership markets in Chico. This location is already well established as Chico’s intercity transit hub, with an existing historic passenger depot, a small parking lot, and a bus stop for Amtrak Thruway buses (for *San Joaquins* Thruway service) and Greyhound/Flixbus buses. Due to grade crossing spacing, establishing a full-length platform to accommodate the project’s needs would require closure of West 3rd Street at the intersection with the tracks.

A layover facility for this station option would ideally be located to the north of the station, which could be placed a substantial distance away to avoid proximity to existing homes and impacts to existing businesses. A potential location north of Muir Avenue (discussed in detail later in **Section 3.6**), for example, would be almost 4 miles from the station.

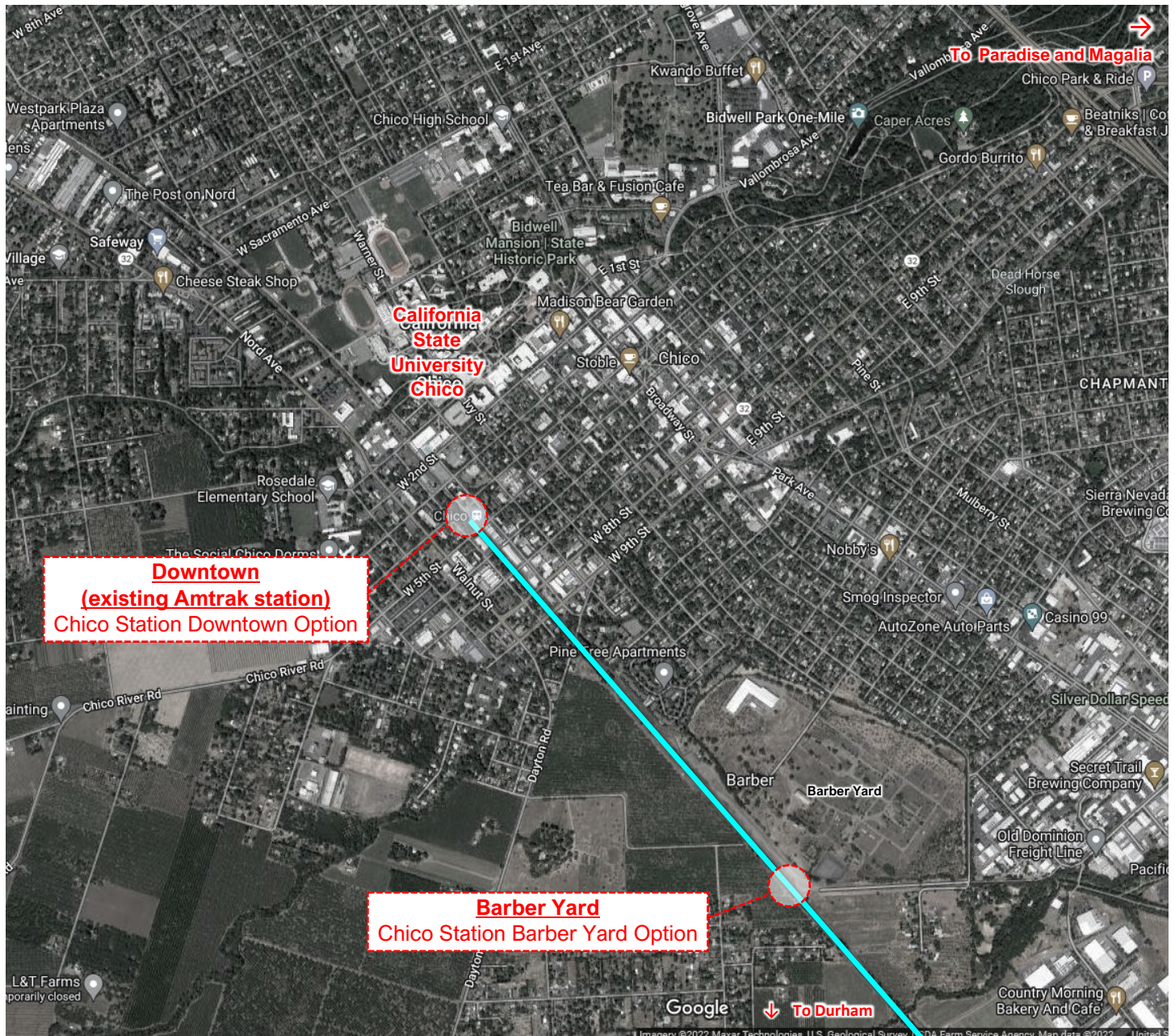
A layover facility south of the station is not necessarily infeasible under this station option, but it would require coordination with UPRR, as trains would need to hold at the platform long enough to reverse direction (as discussed later in **Section 3.6**).

- **Barber Yard.** This site is located in the Barber neighborhood south of Downtown, adjacent to Barber Yard, a large, disused site that was originally a Diamond Match plant. The plant site has been designated as a Special Planning Area (SPA) by the City of Chico and offers a large opportunity for transit-oriented development and a full-amenity station with an adjacent layover facility. According to the Chico 2030 General Plan, the Barber Yard SPA measures approximately 150 acres in total and has development potential for approximately 1,100 dwelling units and over 400,000 square feet of non-residential (office, light industrial, and public) uses. As the site is surrounded by mostly undeveloped or rural/agricultural land along the city’s southwestern city limits, however, additional consideration will need to be given to ensure that there is good access and connectivity for a station at this location. Based on the latest information published by the development team, full buildout of the Barber Yard site would take place within a timeframe of approximately 15 years following completion of environmental review and necessary project approvals.

Given the potential of the two sites, both are being carried forward for further analysis at this time as the Downtown Option and the Barber Yard Option, respectively.

(5) Defined here as a campus not located in one of the State’s major metropolitan areas.

Figure 3-6: Chico Station Sites



Source: Google Earth. Annotations by AECOM.
Aerial imagery from Maxar Technologies, USGS, USDA Farm Service Agency.

3.4 Proposed Service Plan

The proposed initial service plan (to be operating within ten years) addresses the background service context (i.e., without the Project) and key travel markets, and includes a conceptual timetable.

3.4.1 Service Context

Development of the proposed service plan began with consideration of the larger context of the expanded Valley Rail Program. SJRRRC has been a tenant railroad operating passenger service (ACE) on UP's network for more than 25 years, and the substantial progress and extensive coordination with UP on the Valley Rail Program—

particularly, the concept of new passenger service on the Sacramento Subdivision as part of the Sacramento Extension—laid the groundwork for consideration of a potential further extension north into the North Valley.

As the proposed North Valley Rail would begin at the future Natomas terminus of the planned Sacramento Extension for ACE and the *San Joaquins*, it makes logical sense for a proposed service plan for North Valley Rail to begin with an extension of the Natomas trains north into the North Valley. This allows the new service to take advantage of train slots (i.e., roundtrips) that would already be allotted to passenger trains under Valley Rail, providing access to Sacramento and other markets beyond without requiring the allocation of new slots (and, potentially, additional infrastructure investments in the corridor). This approach also allows rolling stock to be shared between both Valley Rail and North Valley Rail and reduces operations and maintenance (O&M) costs. Planning for North Valley Rail as an extension of the Valley Rail Program also simplifies the coordination and partnership with the host railroad (UP), allowing them to focus on a single operator in the corridor for the initial service.

The baseline service plan across ACE and the *San Joaquins*, which is expected to be in operation by the 2030–2033 horizon, is illustrated in **Figure 3-7**. As shown in **Figure 3-7**, a total of 10 roundtrips per day would serve the northern terminus of the Sacramento Extension at Natomas, including 6 roundtrips on ACE and 4 roundtrips on the *San Joaquins*.

The Sacramento Extension is being implemented concurrently with several other major expansions to the ACE system, including the Lathrop to Ceres and Ceres to Merced Extensions, which will create a new southern branch of the ACE system to serve Modesto and Merced, where ACE will connect with HSR. The planned service for the Sacramento Extension, as described and analyzed in the associated environmental impact report, consists of up to 5 roundtrips/day for ACE and up to 2 roundtrips/day for the *San Joaquins*.

Other expansions to ACE and the *San Joaquins* are also in various stages of planning, including the following:

- Up to 5 additional roundtrips a day (over pre-COVID levels) for the *San Joaquins* (for a total of 12 roundtrips/day, 4 of which would serve the Sacramento Extension route)
- A new track connection (MITC) to bring *San Joaquins* trains directly to the new HSR station in Merced
- A new Bay Area branch for the ACE system connecting to a future East Bay Rail Hub at BART's Union City station, with 3 roundtrips/day

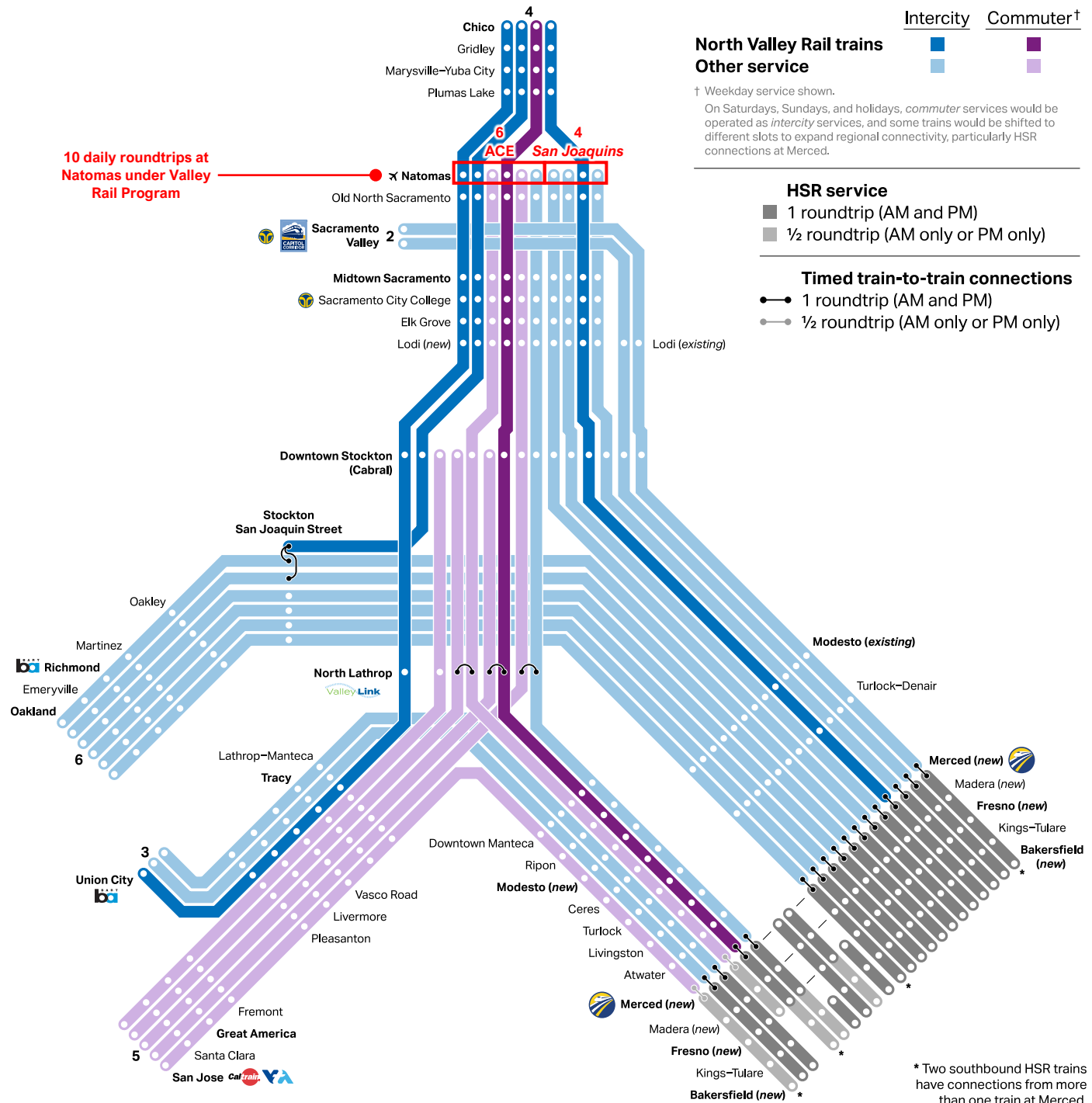
3.4.2 Travel Markets

The proposed service plan considers the travel markets to/from the North Valley. Based on existing travel patterns and an analysis of expected travel times to/from the North Valley, the following key travel markets were identified:

- **Commuter trips to the Sacramento Region.** The proximity of the North Valley to Sacramento, a major job center, makes commuters a key potential market for the new service. Typically, commuter markets are served by commuter rail, which is designed to get passengers to the job center or city center before the start of the workday (by 9:00 am) and then depart after the end of the workday (late afternoon or early evening). Service is usually provided on weekdays only (typically in the commute direction only), and is usually concentrated in the morning and evening peak periods (typically, 6:00–9:00 a.m. and 4:00–7:00 p.m.). Commuter markets are usually best served when door-to-door travel times are on the order of 90–120 minutes or less. Timed local and regional transit connections at stations are also desirable, especially for first-mile/last-mile connections at the job center or city center terminal. Amenities and accommodations such as bicycle storage, in-seat power outlets, or quiet or dim-lit cars, may also be

warranted. Given the distances and travel times involved, commuter markets beyond Sacramento are likely to be negligible.

Figure 3-7: North Valley Rail and Valley Rail Mid-Term Service Vision



Source: AECOM.

- **Business and leisure travel to the Bay Area and San Joaquin Valley (with connections to Los Angeles).** This market includes passengers heading to or from the San Francisco Bay Area, the San Joaquin Valley, Southern California, or other major areas of the state beyond the distances typically

served by commuter rail. These passengers generally prefer a wide range of options in terms of time of day and day of week, including service on weekends and holidays (especially for leisure travelers) and during the midday and evening periods on weekdays. Regional or intercity connections, including HSR in Merced and connecting bus services (to Los Angeles and other destinations), would also facilitate business and leisure travel by serving key population centers or tourist destinations not directly on the train route. Accommodations for baggage and on-board dining, as well as optional seat classes or special ticketing promotions (e.g., for families or groups or for special events), may also be warranted.

- **Chico State University and Butte College affiliates and visitors.** This market is fairly diverse, and can be considered a combination of smaller, overlapping subsets of the above two markets. Campus affiliates (i.e., students, faculty, and staff), for example, include both commuter submarkets (e.g., students, faculty, and staff living outside of Chico) and intercity submarkets (e.g., students living in on-campus housing returning home to other areas of the state for winter break or a long holiday). Visitors can also include a mix of shorter-distance submarkets (e.g., former alumni from Sacramento attending a home softball game or other athletic event) and longer-distance submarkets (e.g., out-of-state family visiting students, out-of-town visitors attending a conference).

To maximize cost effectiveness and potential benefits, the proposed service would ideally be focused on markets with the most promising ridership prospects. As in many other similar situations, this typically means commuter markets. However, the limitations of typical commuter rail (service during weekday peak periods only, in the commute direction only) make it less ideal in terms of trying to integrate the North Valley into the larger statewide rail network, including the goal of providing connections at Merced with the initial operating segment (Merced–Bakersfield) of the statewide HSR system. For example, a commuter service running only between Butte County and Sacramento would, at a minimum, require transfers in Sacramento for longer-distance trips, and, at the worst, make those trips impractical for most passengers due to poor connections or poor options for time of day and day of week.

Thus, the proposed service plan for North Valley Rail is configured to serve commuter markets while at the same time securing a base service level for intercity travel related to business and leisure markets.

3.4.3 Proposed Service Levels

Results of the study indicate that an initial service level target of 4 roundtrips per day for the mid-term planning horizon (service start around 2030–2033) is appropriate based on the potential markets to be served, the baseline service at Natomas (10 roundtrips/day), and the overall cost to increase capacity along the UP Sacramento and UP Valley Subdivisions to accommodate the proposed passenger rail service.

Trip Purpose

In particular, a service plan with 4 roundtrips/day provides a reasonable level of coverage over the entire service day, which, if spaced well, will secure at least some flexibility for passengers in selecting trip itineraries. It also offers good potential to capture multiple markets based on trip purpose and geography, including both intercity markets for business and leisure travel and shorter-distance markets for commute travel.

With 4 roundtrips/day, business and leisure passengers would have multiple options to plan intercity trips, instead of being limited to a single train per day (as is the current situation with the *Coast Starlight*, which is primarily tailored to longer-distance leisure travel and is not timed well for the North Valley market). A service plan with 4 roundtrips/day makes it possible to provide coverage during both the morning and afternoon/evening, allowing passengers the option of a.m. or p.m. arrivals into and departures from the North Valley.

To capture commuter markets to/from Sacramento, 2 of the 4 intercity roundtrips can also be timed to coincide with the morning and afternoon/evening commute periods (i.e., 2 southbound trains in the morning and 2 northbound trains in the afternoon/evening). This provides flexibility for commuters depending on their work schedules, both generally (in terms of assigned work shifts or business hours) and on a day-to-day basis (e.g., earlier-than-usual work start in the morning or later-than-usual work end in the afternoon/evening).

Geography

As shown in **Figure 3-7**, there are at least 5 total branches at the outer extents of the combined ACE and *San Joaquins* network (excluding the Sacramento Valley and Natomas/North Valley branches), spread across 3 major geographic markets:

- **San Francisco Bay Area – Inner core and northeast**
 - Oakland via Richmond, Martinez, and Oakley
- **San Francisco Bay Area – Silicon Valley, Peninsula, and southeast**
 - Union City via Pleasanton, Livermore, and Tracy
 - San Jose via Santa Clara, Fremont, Pleasanton, Livermore, and Tracy
- **San Joaquin Valley south of Stockton**
 - Merced via Turlock (Downtown), Modesto (Downtown), and Manteca
 - Merced via Turlock (Denair) and Modesto (east)

The proposed service of 4 roundtrips/day would provide flexibility to capture multiple branches and geographic markets, providing more utility and convenience to the passenger and helping to ensure the success of the North Valley Rail service.

Service Phasing

A service level target of 4 roundtrips/day also allows for a logical phasing of service if warranted by the Project timeline or costs. An initial rollout phase might, for example, consist of 2 roundtrips/day, with 1 roundtrip/day each for ACE and the *San Joaquins*. Operations can then be expanded to the target of 4 roundtrips per day as the service becomes established and ridership grows. In particular, capital and O&M costs, as well as funding/financing constraints, may warrant a phased implementation that spreads budgetary commitments and risk over one or more phases and allows the service to at least begin operations before the full vision can be realized.

3.4.4 Conceptual Timetable

Following the establishment of the proposed service levels, work began on development of a conceptual timetable for North Valley Rail.

3.4.4.1 Initial Timetable Concept

The initial timetable concept for the North Valley Rail service was developed to reflect the basic service parameters for the Project, including the target service level and desired train slots (i.e., times-of-day). The initial concept was executed in conjunction with development of a conceptual systemwide timetable for ACE and the *San Joaquins* that incorporates the following key service expansions expected to be in place within the mid-term horizon (i.e., by 2030–2033):

- **Sacramento Extension (new route via Midtown Sacramento and Natomas)**
 - ACE: Up to 6 roundtrips/day

- *San Joaquins*: 4 roundtrips/day (in addition to the existing 2 roundtrips/day at Sacramento Valley Station)
- **Lathrop to Ceres and Ceres to Merced Extensions**
 - ACE: Up to 4 roundtrips/day
- **East Bay Hub service (extension to Union City BART)**
 - ACE: Up to 3 roundtrips/day, including 1 commute roundtrip originating from Natomas
- **Interim HSR service at new Merced intermodal hub**
 - *San Joaquins*: 10th, 11th, and 12th roundtrips (4 roundtrips/day total to/from Natomas)
 - Timed HSR connections for ACE and the *San Joaquins*

Timetable concepts developed for earlier efforts (including the Lathrop to Ceres Extension, Ceres to Merced Extension, and Sacramento Extension) were combined to develop the conceptual systemwide timetable. This systemwide timetable establishes the approximate timepoints at Natomas in the baseline condition (i.e., prior to the North Valley Rail service).

Approximate running times for the Project were developed based on track speeds and mileposts (from California Region Timetable 20 by Altamont Press, 2009) and comparable station-to-station data (from the existing *San Joaquins* timetable). Starting with a theoretical extension of all service north of Natomas, recommendations for extension of specific trains were then developed by focusing on those trains that best served the potential ridership markets. Trains that were redundant or those that were likely to be less effective at serving these markets were removed from consideration through a process of elimination until arrival at the desired initial service level (4 roundtrips/day). In close coordination with SJRRC/SJJPA, iterative adjustments were also fed back into the systemwide timetable to balance the needs of the North Valley service with the rest of the ACE and *San Joaquins* networks.

3.4.4.2 Timetable Modeling

An initial timetable concept is typically sufficient to convey target service levels and desired train slots, though a more detailed approach based on timetable modeling is required to allow detailed planning for the Project to move forward. Timetable modeling provides a more accurate and more precise estimate of running times, reflecting the topography of the route and actual train performance (e.g., acceleration profile). Among other things, modeling can also assist in identifying train meet locations in single-track sections and developing a proposed package of track improvements to support the new service.

To initiate the timetable modeling effort for the Project, the Project Team transmitted the initial timetable concept for North Valley Rail, together with a summary of key service parameters and assumptions, to Caltrans and DB Engineering & Consulting (“DB”) staff. Caltrans and its consultants conducted the timetable modeling in Viriato, a timetabling and service planning software used in the network integration analysis for the CSRP. Viriato includes many key functions to assist in the development of timetables, including a running time calculator, platform occupation, conflict detection, and vehicle rostering. Following additional coordination to clarify key timetable constraints (e.g., timed connections with high-speed rail in Merced) and further refine modeling parameters and assumptions (e.g., train consist length and configuration), Caltrans and DB staff provided the Project Team with a summary of the key modeling outputs.

This modeling assumes two scenarios for the design consist for ACE service (one scenario for 1 locomotive with 10 passenger coaches and another scenario for 1 locomotive with 6 passenger coaches). Under both scenarios, *San Joaquins* train consists are assumed to be 1 locomotive with 7 passenger coaches. Modeling was focused on the four proposed North Valley trains, specifically on the route segments between Chico and Merced. Areas

beyond this extent (e.g., Stockton and Union City) and trains not directly serving the North Valley were not included in this modeling effort. These effects are accounted for separately in the stringline analysis described in the following section.

3.4.4.3 Timetable Refinement

To develop a refined timetable concept to be carried forward into subsequent phases of the planning effort, the Project Team extrapolated the modeling outputs provided by Caltrans and DB to the larger, combined ACE and *San Joaquins* systems using a simple stringline-based analysis.⁽⁶⁾ This ensures that the refined timetable concept adequately accounts for effects at the systemwide level, with the understanding that a full systemwide modeling effort is a time- and budget-intensive process well beyond the scope of the Strategic Plan alone.

Based on the modeling outputs, timepoints were adjusted and potential options for slot changes were identified and discussed internally within the Project Team as part of developing the refined timetable concept. The refined timetable concept and associated stringline charts were then transmitted to UP for their review and consideration.⁽⁷⁾

The refined timetable concept is shown in **Table 3-6**, and illustrates the basic service pattern and time of day of the proposed service. The exact timepoints once initial service begins operation would likely be different, as additional refinements will likely be incorporated as part of more detailed operations planning and modeling in later phases of the Project. Longer-lasting effects of the pandemic, for example, may include changes in commute and business travel patterns, which may warrant further changes to better align with passenger demand. Ultimately, the actual timetable for the service will need to be approved by UP, as the host railroad for the corridor.

As shown in **Table 3-6**, the timetable incorporates several key features intended to effectively capture the North Valley's ridership markets:

- **Commute market into Sacramento.** Two roundtrips/day via ACE to ensure attractive service for the commuter market from the North Valley into Sacramento. In the southbound direction, these correspond to trains W01 (to Union City) and D01 (to Stockton San Joaquin Street), with timepoints at Midtown Sacramento at 7:39 a.m. and 8:39 a.m., respectively. The return trips are D02 (from Stockton San Joaquin Street) and W02 (from Union City), with timepoints at Midtown Sacramento at 4:58 p.m. and 6:19 p.m., respectively. These trains also offer relatively attractive commute or day trips from Butte County to the Yuba–Sutter area, with arrivals into Marysville–Yuba City at 6:44 a.m. and 7:44 a.m. and return departures at 5:45 p.m. and 7:06 p.m.

(6) A stringline (or string) chart is a method of visualizing a train timetable or train operations along a defined section of track. Each train is plotted as a stringline—a curve that defines the train's location as a function of time. Stringlines are especially useful in service and operations planning, providing an easy tool to visualize and resolve train and track conflicts, such as train meets or passes in single-track sections.

(7) The initial intent of providing the refined timetable concept to UP was to allow them to conduct their own operations modeling and simulation analysis using the Rail Traffic Controller (RTC) software package, to allow for closer coordination and confirmation regarding the initial list of track improvements along the Project corridor between Natomas and Chico. The results of UP's operations modeling analysis, including identification of potential infrastructure improvements, would also have informed further refinement of the conceptual timetable. In subsequent discussions with UP staff, however, they indicated that they would prefer to defer detailed operations modeling and identification of infrastructure improvements to the environmental phase of the Project.

Table 3-6: Refined Timetable Concept

Northbound						Southbound											
W01	D01	J04	J01	N06	C04	Station		C03	N01	J10	J07	D02	W02				
CIC	CIC	OKJ	MCDA	CIC	CIC	Train Origin		MCDA	MCDA	OKJ	MCDA	SKN	UNC				
UNC	SKN	MCDA	OKJ	MCDA	MCDA	Train Destination		CIC	CIC	MCDA	OKJ	CIC	CIC				
6:02	7:02			10:30	17:03	▼	Chico	CIC	▲	9:43	15:15						
6:26	7:26			10:54	17:27	▼	Gridley	GRD	▲	9:19	15:51			18:28	19:49		
6:44	7:44			11:11	17:45	▼	Marysville–Yuba City	MRV	▲	9:00	14:34			18:04	19:25		
6:54	7:54			11:21	17:55	▼	Plumas Lake	PLU	▲	8:51	14:24			17:45	19:06		
7:17	8:17			11:44	18:18	▼	Natomas	NAT	▲	8:28	14:02						
7:33	8:33			11:52	18:27	▼	Old North Sacramento	NSAC	▲	8:19	13:53			17:13	18:34		
7:39	8:39			11:58	18:33	▼	Midtown Sacramento	MDT	▲	8:13	13:48			17:04	18:25		
7:44	8:44			12:02	18:38	▼	Sacramento City College	SUT	▲	8:08	13:42			16:58	18:19		
7:54	8:54			12:12	18:48	▼	Elk Grove	EKGA	▲	7:59	13:33			16:53	18:14		
8:20	9:20			12:37	19:14	▼	Lodi (<i>new</i>)	LODA	▲	7:33	13:09			16:44	18:05		
8:34	9:34					12:51	19:28	▼	Downtown Stockton (Cabral)	SKT	▲			7:18	12:55	16:18	17:39
	9:38	→	9:48	9:53			▼	Stockton San Joaquin Street	SKN	▲			15:48	15:53	→	15:58	
8:44						19:38	▼	North Lathrop	NLT	▲	7:07						17:13
8:51							▼	Lathrop–Manteca	LTM	▲							17:07
9:03							▼	Tracy	TRA	▲							16:48
9:32							▼	Vasco Road	VAS	▲							16:19
9:37							▼	Livermore	LIV	▲							16:14
9:45							▼	Pleasanton	PLS	▲							16:05
							▼	Fremont	FMT	▲							
							▼	Great America	GAC	▲							
							▼	Santa Clara	SCC	▲							
							▼	San Jose (Diridon)	SJC	▲							
10:09							▼	Union City	UNC	▲							15:40
				10:22			▼	Oakley	OKY	▲			15:21				
				10:54			▼	Martinez	MTZ	▲			14:51				
				11:23			▼	Richmond	RIC	▲			14:21				
				11:34			▼	Emeryville	EMY	▲			14:10				
				11:43			▼	Oakland (Jack London Square)	OKJ	▲			13:59				
						19:48	▼	Downtown Manteca	DMT	▲	6:58						
						19:57	▼	Ripon	RIP	▲	6:49						
						20:10	▼	Modesto (<i>new</i>)	MODA	▲	6:35						
						20:17	▼	Ceres	CRS	▲	6:28						
						20:27	▼	Turlock	TRKA	▲	6:18						
						20:40	▼	Livingston	LVG	▲	6:06						
						20:47	▼	Atwater	ATW	▲	5:58						
			10:20		13:20		▼	Modesto	MOD	▲		12:26		15:26			
			10:33		13:33		▼	Turlock–Denair	TRK	▲		12:13		15:13			
			11:00		14:00	20:56	▼	Merced (<i>new</i>)	MCDA	▲	5:50	11:46		14:46			
		↓		↓				↑		↑				↑			
	11:08			14:08	21:08	▼	Merced		▲	5:42	11:42			14:42			
	11:30			14:30	21:30	▼	Madera		▲	5:21	11:21			14:21			
	11:41			14:41	21:41	▼	Fresno		▲	5:09	11:09			14:09			
	11:58			14:58	21:58	▼	Kings–Tulare		▲		10:53			13:53			
	12:30			15:30	22:30	▼	Bakersfield		▲		10:19			13:19			
		111		117		131		ST-2		110				116			

Source: AECOM.

- **San Francisco Bay Area service.** Two roundtrips/day connecting the North Valley with the San Francisco Bay Area, including one direct service to/from Union City via Stockton (W01 and W02) and one transfer at Stockton San Joaquin Street station to/from Oakland (D01+J01 and D02+J10). The one-seat service (W01 and W02) provides a 5½-hour window at the Union City end, or approximately 3–4 hours after deducting travel time on BART or other connecting modes, which would generally be sufficient to accommodate one to two business or lunch meetings. While travel time to/from the Bay Area may be longer than via the *Capitol Corridor* route, these trips provide an alternative route via Stockton that gives riders additional travel options to supplement the *Capitol Corridor*. The Union City service, in particular, offers better connectivity for the South Bay/Silicon Valley, in conjunction with a one-seat ride that avoids the hassle and penalties of transferring to/from the *Capitol Corridor* at Sacramento Valley Station.
- **HSR connections.** Three roundtrips/day connecting with HSR at Merced (1 of which requires a transfer in Stockton), with reasonable spacing throughout the day given the constraints imposed by running times (e.g., approximately 3 hours, 30 minutes by *San Joaquins* and 3 hours, 50 minutes by ACE between Chico and Merced).
- **Stockton San Joaquin Street transfers.** One roundtrip/day (D01 and D02) with a transfer to/from both directions of the *San Joaquins* (Merced for HSR or Oakland for the Bay Area) at Stockton San Joaquin Street Station. This approach strategically expands the areas that have access to/from the North Valley by providing a second Bay Area connection and a third HSR connection combined in one train, while keeping potential capital and operating costs down by maintaining service north of Natomas at 4 roundtrips/day.
- **North Valley inbound market.** One roundtrip/day (C03 and C04) that provides almost a full-day window for passengers inbound into the North Valley, such as commuters (e.g., students, faculty, or staff at Chico State) or tourists and other visitors.

3.4.5 Service to/from Sacramento Valley Station

Direct service to/from Sacramento Valley Station was also considered from the early stages of this initial planning process. Sacramento Valley Station is currently Sacramento’s main regional and intercity transit hub, with direct connections to local and regional transit services, including the *Capitol Corridor* and the Sacramento Regional Transit (“SacRT”) Gold Line light rail. Sacramento Valley Station is also closer to Capitol Mall and the major employment areas of Downtown Sacramento, which are easily accessible via the Gold Line or SacRT buses or on foot.

While the track connections and layout at Control Point (CP) West Haggin (where the UP Martinez Subdivision and UP Sacramento Subdivision cross) would allow for service to/from the station, this would likely require substantial additional coordination that would make North Valley Rail a longer-term endeavor. In particular, the Martinez Subdivision is an important corridor for both passenger and freight traffic, and UP may be averse to the idea of allowing additional slots for passenger trains—even on this relatively short segment to/from the station—without additional substantial investment in infrastructure. Extensive coordination would also likely be necessary with the Capitol Corridor Joint Powers Authority (CCJPA), both to ensure adequate schedule coordination for passengers transferring with the *Capitol Corridor* and to secure an open track and platform for North Valley trains that serve the station.

Additional operational considerations include whether to terminate the train at the station or to have it continue to/from other routes. Terminating the service at the station would require consideration of adequate layover capacity, which may entail expansion of an existing layover facility or construction of a new layover facility. Similarly, continuing the service beyond the station, whether to/from the *Capitol Corridor* route or to/from

Midtown Sacramento and Stockton, could also require substantial coordination and potential infrastructure investment that would increase scope and risk (and, likely, cost) for implementation of the North Valley service. The latter option, in particular, would introduce some additional operational complications without significant investment in new track connections to allow for through-running, as Valley Rail/North Valley Rail trains would enter Sacramento Valley Station to serve passengers and then be forced to reverse direction to continue their journey. This movement would likely result in additional dwell time at the station platform, increasing travel time for through passengers.

One alternative might consider planning North Valley Rail as a separate service isolated from the rest of the Valley Rail Program and operating strictly between Chico and Sacramento Valley Station. While this approach avoids the passenger delays due to train reversal described above, it requires additional slots on the Sacramento Subdivision between Natomas and Haggin beyond the 10 roundtrips/day already planned for as part of the expanded Valley Rail Program. This approach also does not capture the other benefits of North Valley Rail as an extension of the Valley Rail Program (including sharing of rolling stock and reduced O&M costs) as discussed in **Section 3.4.1**, and still does not address the issue of additional train slots on the Martinez Subdivision.

Given these considerations, it was deemed appropriate to focus on extension of the baseline ACE and *San Joaquins* service at Natomas for this mid-term effort, as opposed to introduction of a new service exclusively for the North Valley market. By building off the Sacramento Extension and other existing efforts, this approach offers substantial benefits in terms of getting the service up and running as quickly and efficiently as possible while still allowing a Sacramento Valley Station service to be explored in more depth as part of a longer-term effort.

Despite the various complications described above, a connection into Sacramento Valley Station would be very desirable in many ways by facilitating transfers with the *Capitol Corridor* and other existing rail services on the Martinez Subdivision, providing an additional connection with the SacRT light rail system and other local/regional transit services in the Sacramento area, and strengthening Sacramento Valley Station as a major transit hub. Caltrans, through the Rail Planning & Implementation Office of the Division of Transportation Planning, is currently leading a study—in coordination with BCAG, SJRRC, SJJPA, CCJPA, the City of Sacramento, and UP—to look at opportunities to provide direct service to the station and help determine what would be required to enable such service. This study is expected to be done in time to inform the upcoming environmental work for North Valley Rail and could alter the conclusions above regarding the timing for providing service between Chico and Sacramento Valley Station.

3.5 Rolling Stock

Similar to most other mainline rail operations elsewhere in California, the current fleets for both ACE and the *San Joaquins* consist of diesel locomotives operating in a push–pull configuration with a series of passenger coaches. With the various expansions to both systems currently underway, it is expected that SJRRC/SJJPA will need to expand both fleets, with funding and procurement assistance from the State. New trainsets for some of these expansions are already being secured through one or more joint procurement processes led by the State (via Caltrans), in conjunction with SJRRC/SJJPA.

The exact technologies for these new trainsets have not yet been determined but could include additional locomotives and passenger coaches for conventional locomotive-powered operations or higher-performance solutions such as zero-emissions multiple-unit (ZEMU) trains.

Aside from sharing a common technology (diesel locomotives with passenger coaches), the existing fleets for both ACE and the *San Joaquins* are quite different from each other, reflecting the fundamental differences between the two services and their key existing markets. As the various service expansions under the Valley Rail Program come online and the HSR EOS begins service out of Merced, however, ACE and the *San Joaquins* are

likely to become much more similar and complementary in nature. ACE and *San Joaquins* trains would both function as key feeder services for HSR sharing corridors, stations, and maintenance/layover facilities, and operating in an integrated fashion, whereby passengers may have the option of taking an ACE train in one direction and a *San Joaquins* train on the return trip.

The currently proposed service plan for North Valley Rail consists of 4 total daily roundtrips, including 3 "intercity" roundtrips (2 operated as ACE trains and 1 operated as a *San Joaquins* train) and 1 "commuter" roundtrip (operated as a *San Joaquins* train).⁽⁸⁾ Given that North Valley Rail is envisioned as an extension of services already planned under the expanded Valley Rail Program, it is not currently envisioned that new trainsets will be required expressly for North Valley Rail. Trains for North Valley Rail would already be operating as far north as Natomas under the expanded Valley Rail Program and would simply be extended north to Chico. As such, a detailed analysis of rolling stock options for North Valley Rail is part of a much larger discussion about the expanded Valley Rail Program regarding future rolling stock across the expanded ACE and *San Joaquins* systems.

ACE's current trains use Bombardier BiLevel passenger coaches, while the current fleet for the *San Joaquins* relies primarily on "California Car" bi-level coaches and a smaller set of "Comet Car" single-level coaches. New single-level Siemens Venture Car trainsets for the *San Joaquins* are in the process of being delivered and are expected to enter service soon. Both systems use a mix of locomotives, including newer Siemens Charger locomotives, and ACE is working with the State on the development of zero-emissions locomotives.

Separately, the California State Transportation Agency (CalSTA) and Caltrans have signed a Memorandum of Understanding with Stadler for the delivery of new hydrogen-powered ZEMU trainsets (based on Stadler's FLIRT model) for use on State-funded intercity services, which would potentially include both ACE and/or the *San Joaquins*.

Figure 3-8 shows three of the trainset types currently being considered (Bombardier BiLevel, Siemens Venture, and Stadler FLIRT).

An ultimate decision about the exact future rolling stock to be procured for the expanded Valley Rail Program, including North Valley Rail, is dependent on several competing factors and will likely not be made until more progress is made on overall systemwide fleet planning. Key considerations for rolling stock to be used include the following:

- **Types of markets served.** Intercity services typically warrant food and beverage options, more legroom, and baggage storage areas, which may be lower priorities for commuter services, which typically place more emphasis on maximizing seating capacity.
- **Availability of zero-emissions models.** Zero-emissions locomotives are still under development and testing, and available ZEMU models currently have limited operating ranges that may not be suited for some of the proposed North Valley Rail services.
- **Passenger capacity.** Single-level trainsets such as the Siemens Venture and Stadler FLIRT models have less capacity than bi-level trainsets. Some analysis of trainset capacity relative to the forecasted ridership demand can be found in **Section 5.3**.

The proposed equipment and technologies used for North Valley Rail and the rest of the expanded Valley Rail Program will also need to be approved by applicable Federal and State regulatory agencies and host railroads (e.g., UP, BNSF) for operation over their infrastructure.

(8) On weekends and holidays, the "commuter" roundtrip would be operated as an "intercity" service.

Figure 3-8: Potential Future Rolling Stock



3.6 Proposed Layover Facility

A layover facility is needed for North Valley Rail to facilitate midday or overnight storage of trains in the vicinity of the northern terminus station in Butte County (Chico), as well as potentially accommodate various light maintenance duties (e.g., restroom cleaning). Heavy maintenance duties would be accommodated at other maintenance facilities, such as existing facilities in Stockton (for ACE) and Oakland (for the *San Joaquins*) or the planned facility in Merced (to be shared between ACE and the *San Joaquins*).

3.6.1 Methodology and Approach

A layover facility would ideally be located near the terminal station in Chico in order to minimize deadhead (non-revenue) travel distance and time, which can have substantial effects on day-to-day operations and costs. Placing the layover facility and station in close proximity to each other may also have a significant benefit in terms of reducing capital investment and costs, particularly if UP requests construction of an additional main track between the terminal station and the layover facility. In the case of North Valley Rail, a layover facility located just north of the terminal station is also generally preferable from an operations perspective, as it eliminates the need to reverse the direction of the train when traveling between the station and the layover facility.

In terms of physical dimensions, the layover facility must be a sizeable site with sufficient aggregate track capacity to accommodate the required number of trains at their respective train lengths. The conceptual timetable in **Table 3-6**, for example, would generally require layover capacity for up to 3 trains simultaneously (W01, D01, and N06), with the fourth train (C04) operated as the return trip of C03 and based out of Merced.⁽⁹⁾ While the required dimensions for the facility have not been fully determined at this time and are somewhat flexible depending on the desired operations scheme, a conservative assumption in this early planning stage would assume up to 4 trains requiring layover space simultaneously.

Areas along the rail corridor near the proposed terminal locations were reviewed based on aerial imagery and field visits, focusing on those sites with sufficient size located on vacant or lightly utilized land (in order to minimize potential costs and impacts to surrounding neighborhoods).

3.6.2 Layover Facility Options

Two options for a layover facility in or near Chico were identified, as illustrated in **Figure 3-9**:

- North Option.** The closest potential layover facility site north of the Chico station options is on agricultural land north of Muir Avenue, along the existing single main track. This option has two variants—an East Variant and a West Variant—depending on whether the layover facility is located on the east side or west side, respectively, of the UP mainline track.

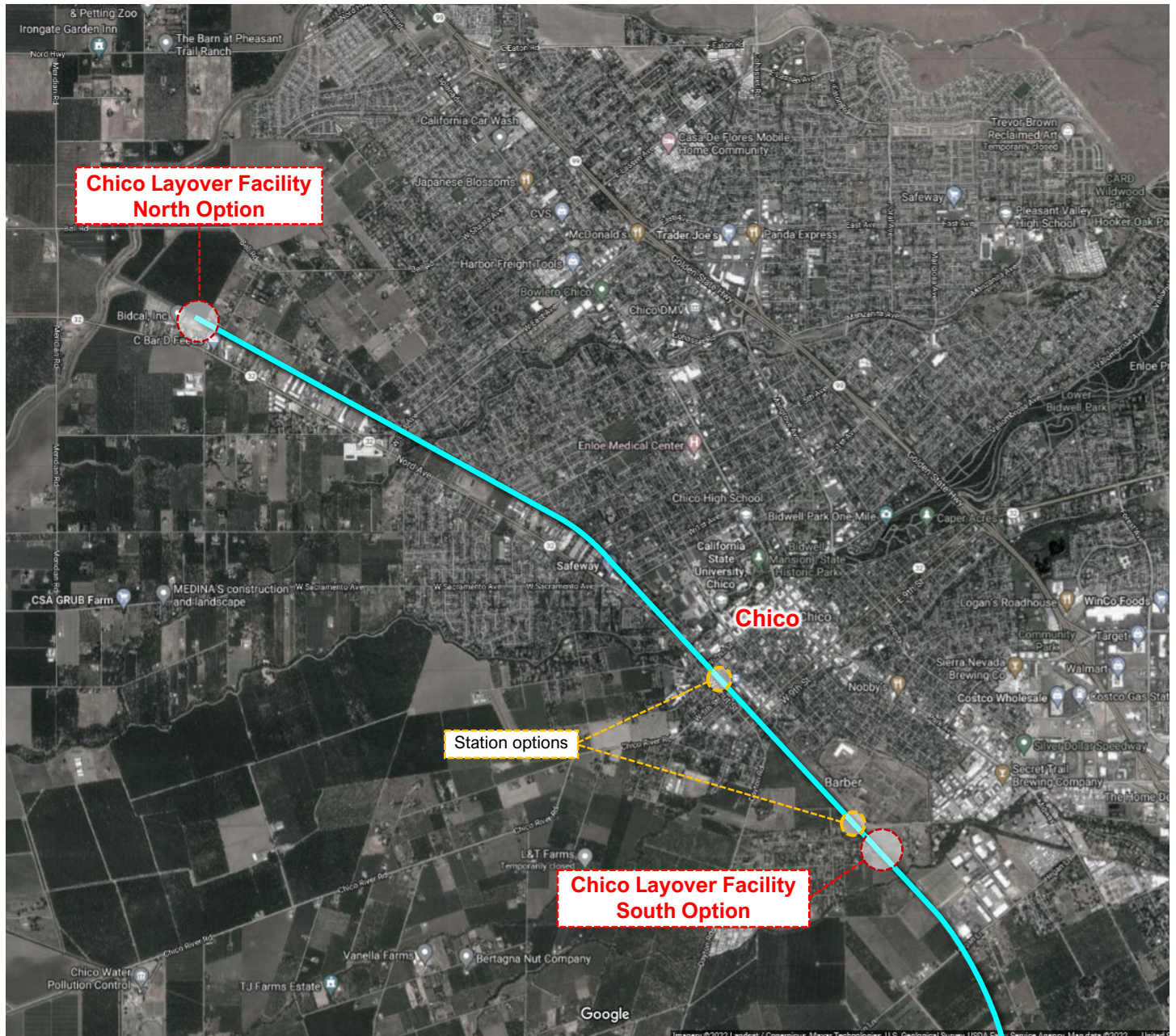
The location of the layover facility under this option is almost 4 miles from the existing Amtrak station in Downtown Chico and approximately 4½ to 5 miles from the Barber Yard station option. Areas to the south closer to the existing Amtrak station are already largely built up or in close proximity to residential neighborhoods, making them potentially less desirable for a layover facility with a mid-term service start by 2030–2033 due to costs, impacts to surrounding residents, and other potential risks. This option as

(9) If the “C” and “N” trains are operated in an integrated fashion, with northbound C03 returning as southbound N06 and northbound N01 returning as southbound C04, then the required layover capacity would be up to 2 trains simultaneously (the “W” and “D” trains). This would, however, require that the “C” and “N” trains be operated with the same general trainset type and configuration.

initially conceived would also result in the loss of existing agricultural land, although this loss would likely only be on the order of 1 to 2 acres.

- **South Option.** This site is co-located with the Chico station option at Barber Yard and is approximately 1¼ mile south of the existing Amtrak station. It is located on vacant undeveloped or under-utilized land south of Estes Road and is comparatively closer to both station options (the existing Amtrak station in Downtown Chico or a Barber Yard station) than the North Option. Depending on the final siting within the Barber Yard area, this location may be slightly closer to existing and/or future residential uses, however, and may therefore have a larger impact to surrounding residents than the North Option.

Figure 3-9: Chico Layover Facility Sites



Source: Google Earth. Annotations by AECOM.

Aerial imagery from Landsat/Copernicus, Maxar Technologies, USGS, USDA Farm Service Agency.

While both layover facility options are being carried forward for further analysis, the North Option would only be used for the Downtown Chico station option, while the South Option could be utilized with either Chico station option. If the South Option is used in conjunction with the Downtown Chico station option, additional coordination with UPRR would be needed to evaluate the effects of holding the train at the platform long enough to reverse direction, as the layover facility would be located south of the station.

3.7 Bus Connections

This section describes potential improvements to local/regional bus connections that could be explored in conjunction with implementation of North Valley Rail. These recommendations are preliminary at this stage and reflect bus service as it was in early 2022. Since then, BCAG, as the owner and operator of B-Line, has completed a routing study for the system to optimize ridership and service, and many more iterations of service changes will likely take effect before North Valley Rail is in service. The concepts identified here should be used as a general guideline to explore potential ways to enhance local/regional bus connections at stations and expand the geographic reach of North Valley Rail in closer coordination with relevant local agencies and transit operators.

3.7.1 Plumas Lake

Currently, there are no local bus routes serving Plumas Lake, but regional commuter express buses operated by Yuba–Sutter Transit stop at a park-and-ride facility at the southeast quadrant of the SR 70 Feather River Boulevard interchange. These buses are primarily designed to get commuters to/from Sacramento, although some trips also allow for travel to/from Marysville and Yuba City.

As only a portion of Plumas Lake is currently built out, it is likely that bus service will warrant expansion in the future as the rest of the overall development is completed. This would likely include expanded regional/commuter service connecting to Sacramento and Marysville/Yuba City, as well as perhaps new regional service to/from Wheatland and local service within Plumas Lake. As development progresses, BCAG should coordinate with Yuba–Sutter Transit and other partners to consider potential improvements to bus service:

- **Park-and-ride facility relocation.** Relocate the Plumas Lake park-and-ride facility to the train station to provide a consolidated local and regional transit hub.
- **Plumas Lake circulator route.** Establish a local circulator route through Plumas Lake, with a terminal at the Plumas Lake station to provide good connections to/from trains and other bus routes.
- **Wheatland connection.** Establish a new regional bus connection between the Plumas Lake station and Wheatland. This could be operated as an all-new service or as a realignment of the existing Wheatland–Marysville service from SR 65 to SR 70.
- **Olivehurst and Linda connection.** Establish a new regional bus connection between the Plumas Lake station, Olivehurst, and Linda. This could be operated as an all-new service, with a potential extension north to Marysville, or as a realignment of the existing Wheatland–Marysville service from SR 65 to SR 70.
- **Toyota Amphitheatre and Hard Rock Hotel and Casino shuttles.** Provide shuttle services connecting the Plumas Lake station with the Toyota Amphitheatre and the Hard Rock Hotel and Casino. This could include dedicated pre- and post-event shuttles (dependent on event time of day and alignment with train schedules). SJRRRC/SJJPA have already reached out to key stakeholders in the Plumas Lake area to explore opportunities for new transit services connecting the station there with key nearby destinations.
- **Weekend and holiday service.** Expand bus service to weekends and holidays to ensure connections with train service are available outside of weekdays.

3.7.2 Marysville–Yuba City

The North Option for the Marysville–Yuba City station would be located within short walking distance of the Yuba County Government Center (I Street at 9th Street in Marysville), which is a major transfer point for Yuba–Sutter Transit local and regional buses. This stop is served by two local routes, as well as multiple regional routes, including commuter buses to/from Sacramento (both via SR 70 and via Yuba City and SR 99) and all three of Yuba–Sutter Transit’s “rural” routes.

As the existing bus coverage for Marysville, Yuba City, and surrounding communities is quite good given the largely suburban and rural context of the Yuba–Sutter area, it is recommended that BCAG coordinate with Yuba–Sutter Transit on potential improvements to bus service that focus on enhancing the existing system:

- **Route extension to station.** Extend bus service closer to the train station to reduce walking distance and strengthen the train station’s role as a local and regional transit hub. In the short-term timeframe, this could include a simple extension of selected bus trips to the station (based on alignment with train timetables), but could be expanded to include a relocation of the Yuba County Government Center transfer point, with expanded amenities (e.g., bus shelters, seating, real-time information). In the long-term timeframe, the relocation could be combined with a larger transit-oriented redevelopment of the adjoining retail center.
- **Expanded service days and hours.** Expand service days and hours for local buses (Route 1 and Route 4) to ensure connecting service is available every day (7 days a week, including holidays) and for all scheduled trains. For the 3 rural routes (Foothill, Live Oak, and Wheatland) that currently operate 1–2 roundtrips/day, this could be a focused expansion that only adds trips that are appropriately timed for train connections and keyed to the communities and travel patterns that would need to be served.

If the South Option for the station is selected, extension of bus routes to the station will be somewhat more critical to ensure adequate connecting transit, as there are only two bus routes that pass in the vicinity of the station under this option (along 3rd Street and H Street), and the Yuba County Government Center is 12–15 minutes away from the station on foot.

3.7.3 Gridley

Gridley is served by two B-Line bus routes, but these routes currently travel along SR 99 and Spruce Street through Gridley and do not directly serve the proposed station location, although the closest stops—Spruce Street at Kentucky Street (Gridley City Hall) and East Gridley Road at SR 99—are within short walking distance. The following improvements to bus service are recommended:

- **Route extension to station.** Extend existing bus service closer to the train station. Route 30 can be extended by incorporating a branch of the route that loops to and from the station via Magnolia Street, between the existing stops at East Gridley Road at SR 99 and at Spruce Street at SR 99 (Orchard Hospital). Route 32 can be extended by adding a detour south to Laurel Street between the existing stops at Spruce Street at Kentucky Street and at Spruce Street at SR 99.

As shown in **Figure 3-1**, Gridley would be the closest station to Oroville on the proposed route alignment and buses here would provide convenient connections for passengers making continuing journeys to/from the Oroville area. This could be accomplished through the extension of Route 30 directly to the station in Gridley, as suggested above, which would provide good access to/from Oroville proper, as well as surrounding unincorporated areas including Thermalito, South Oroville, Oroville East, Palermo, and the Mooretown Rancheria (Feather Falls) area. Alternatively, the Gridley–Oroville bus connection could be provided by a new B-Line route.

3.7.4 Chico

3.7.4.1 Downtown Chico Option

Downtown Chico is served well by existing B-Line system, and while the existing Amtrak station is not directly served by B-Line buses, many B-Line routes travel along West 2nd Street (within a block of the station). Additional B-Line service is available at the Chico Transit Center, 5–6 blocks east of the station at the West 2nd Street/Normal Avenue intersection.

Existing transit service is fairly robust, but is tailored to existing demand markets (e.g., Chico State) and the Chico Transit Center. In particular, routes terminating at the Chico Transit Center and serving areas to the northeast, east, or southeast would, at first glance, appear to be candidates for extension to the station, but are actually interlined with other routes and would require substantial detours to serve the station.

Given these considerations, the following potential improvements to bus service are recommended under the existing (Downtown Chico) station option:

- **Pedestrian connection to West 2nd Street bus stops.** Coordinate with City of Chico to provide proper wayfinding and an attractive pedestrian connection between the station and the existing bus stops at West 2nd Street at Cedar Street. This could include treatments such as sidewalk widening, crosswalk enhancements (e.g., striping or pavement treatments, corner bulb-outs, installation of traffic signals or other traffic control devices, crosswalk daylighting, etc.), or pedestrian realm activation (e.g., street trees or landscaping, street furnishings, etc.).
- **Extension of local B-Line routes to station.** Extend local bus routes within Chico to the station to provide better first-mile/last-mile connections. Based on initial analysis and input from BCAG staff, Route 9, which has a portion of its west loop running along Oak Street, could be shifted closer to the station by continuing east along West 7th Street, and appears to be the best candidate for such an extension. Route 9 already has good on-time performance and could be extended to the station without major deviations from the existing route, resulting in the least impact to existing service and existing riders. Route 2 would also appear to be a potential candidate because it is not interlined with any other routes at the Chico Transit Center, but it already suffers from poor on-time performance and is therefore not recommended for extension to the station.

If extension of local bus routes is deemed infeasible, an alternative solution for consideration could involve establishing a new route to connect the train station and Transit Center. This alternative could be combined with a “circulator shuttle” concept, operating the connection as a one-way (or potentially two-way) loop through Downtown Chico. One potential loop route could be via West 2nd Street, Cedar Street or Orange Street, West 8th Street or West 9th Street, and Broadway Street or Main Street.

- **Extension of regional/rural B-Line routes to station.** In addition to local B-Line routes, extend regional/rural B-Line routes to the station. Based on initial analysis, Route 20 (Chico–Oroville) appears to be a promising candidate for such an extension, as it is one of B-Line’s best-performing routes in terms of ridership. While connections to/from Oroville would already be provided at the Gridley station, Route 20 serves multiple stops within Chico proper, and extending it to the station significantly improves local access to/from the Downtown Chico station (given the complications of extending the local B-Line routes operating within Chico).

Based on input from BCAG staff, however, Route 32 (Chico–Gridley) and Route 40/41 (Chico–Paradise–Magalia) would be more likely candidates despite low ridership, as Route 20 has some issues with on-

time performance. Route 40/41 would also be a potentially good candidate in terms of better connecting the foothill communities (Paradise and Magalia) with the Downtown Chico station.

3.7.4.2 Barber Yard Option

The Barber Yard site is largely vacant or unoccupied and is currently not well-served by transit, thus creating challenges with any proposed B-Line deviations to the site. The closest bus service is along Park Avenue to the northeast of the site (Routes 14, 17, and 32) and along the West 8th Street/West 9th Street couplet to the northwest of the site (Route 5). While an exact station location has not been identified, the walking distance to/from these stops would likely be over one half-mile. Eventual redevelopment of the Barber Yard site could, however, warrant new bus service that could directly serve both the station and the surrounding neighborhoods.

Given these considerations, the following potential improvements to bus service are recommended under the Barber Yard option:

- **Extension of local B-Line routes to station.** Extend local bus routes within Chico to the station to provide better first-mile/last-mile connections. Route 2, which is not interlined with any other route at the Chico Transit Center, could be a candidate for such an extension (e.g., via Broadway Street/Main Street, Park Avenue, and West 16th Street).

If extension of local bus routes is deemed infeasible, an alternative solution for consideration could involve establishing one or more new routes that would provide direct connections with the train station. This could be considered in conjunction with bus service improvements for the larger redevelopment of the entire Barber Yard site, which may warrant entirely new routes that could then be easily extended to the station without substantial disruptions to existing B-Line operations.

- **Ensure a high-quality connection with the Chico Transit Center to allow for transfers to/from regional/rural B-Line routes.** Given the location of the Barber Yard site, extension of Chico's existing regional/rural B-Line routes—namely, Route 20 (Chico–Oroville), Route 32 (Chico–Gridley), and Route 40/41 (Chico–Paradise–Magalia)—is likely infeasible due to substantial out-of-direction movement and added running time, which would likely have a substantial impact on operations and on-time performance. Therefore, an alternative solution should focus on ensuring a high-quality connection with the Transit Center, where passengers would then have the option of continuing their journey on other B-Line routes to/from the foothills or other parts of the county. As mentioned above, this connection could be provided by existing local B-Line routes or by new routes serving the larger Barber Yard development.

3.7.5 Other Bus Connections

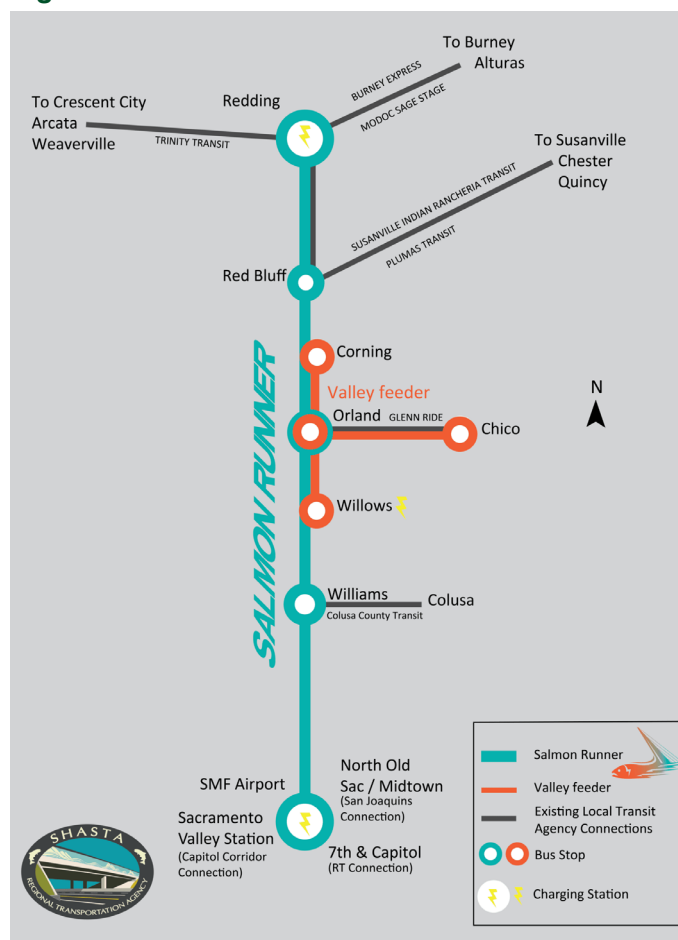
In addition to the local/regional bus connections described above, additional bus service improvements are recommended:

- **Glenn Ride improvements.** Work with County of Glenn on adjustments to the existing Glenn Ride service connecting Willows, Orland, and Chico, which currently provides 7 roundtrips/day Mondays through Fridays and 3 roundtrips/day on Saturdays and holidays. The route currently terminates at Chico Transit Center and could be extended relatively easily to either the Downtown Chico station or the Barber Yard station. Train connections should be provided every day and for all scheduled trains.

- Red Bluff and Redding connection.** Work with the Redding Area Bus Authority (RABA), SRTA, and other partners on bus connections between Oroville, Chico, Red Bluff, and Redding. As illustrated in **Figure 3-10** to the right, the planned *Salmon Runner* service would run along Interstate 5 (I-5) between Redding and Sacramento, with intermediate stops at Red Bluff, Orland, Williams, and Sacramento International Airport. The *Salmon Runner* also includes proposed feeder service at Orland to provide connections for Chico, Corning, and Willows.

With the extension of trains north of Natomas, there would be partial overlap in ridership markets between bus and rail services, and the goal should be to ensure that the two services are complementary and synergistic, as opposed to duplicative and competitive. This may ultimately mean that the *Salmon Runner* remains separate from North Valley Rail, retaining its connections with ACE and the *San Joaquins* at the planned station in Old North Sacramento (in lieu of any of the new North Valley Rail stations). In that case, separate bus service out of Chico could be desirable to provide connections to/from Redding and Red Bluff.

Figure 3-10: Salmon Runner Schematic Route



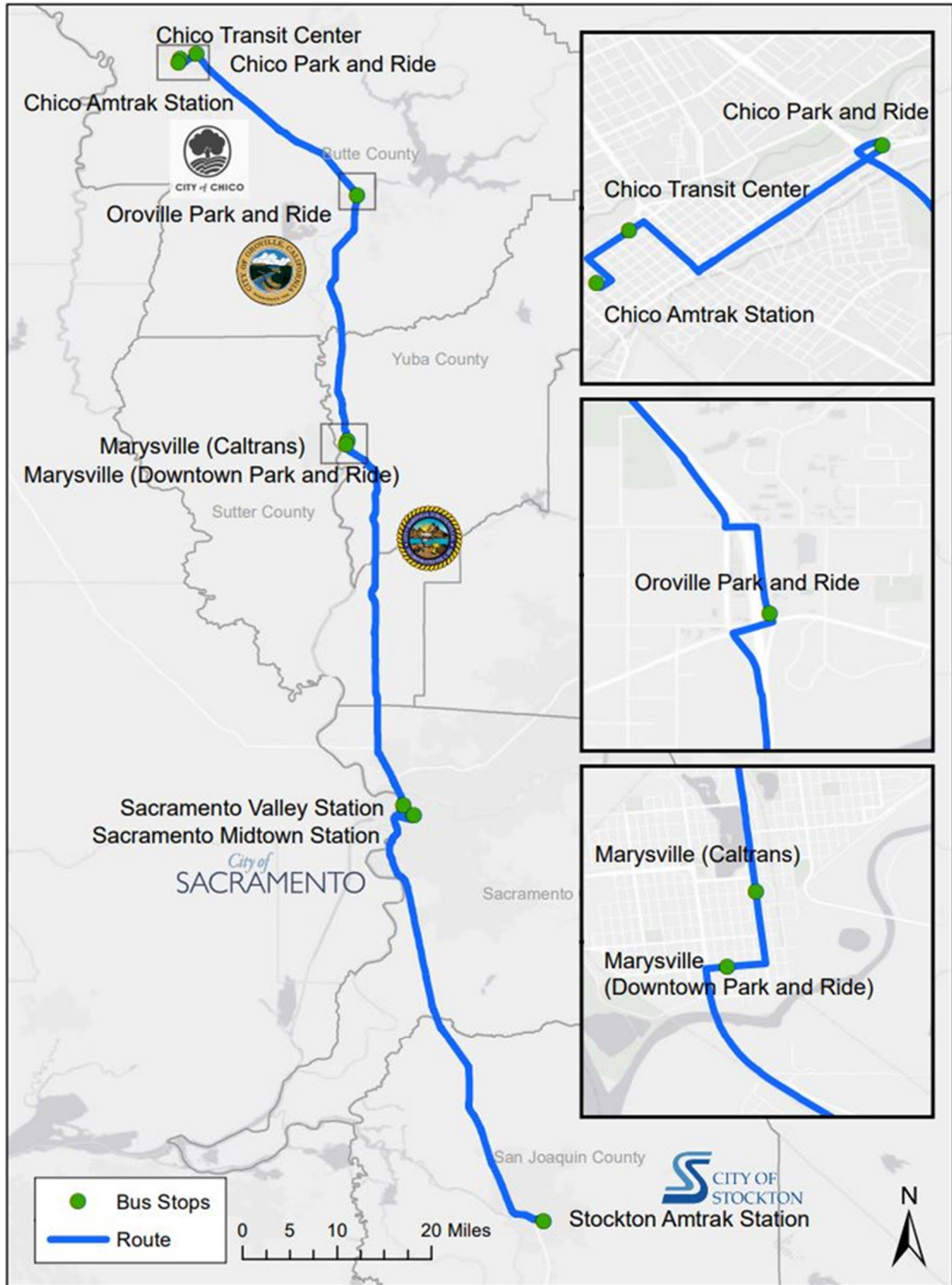
Source: Shasta Regional Transportation Agency.

- Supplementary parallel bus service.** BCAG recently studied an enhanced intercity bus service within the North Valley Rail corridor as a possible replacement and expansion of the existing Amtrak Thruway Route 3 bus service. The basic parameters for this initial bus service were developed by BCAG (in partnership with SJJPA and Caltrans) as part of the *Chico to Sacramento Inter-City Transit Strategic Plan* (January 4, 2022).

The plan calls for 9 intercity bus roundtrips/day on weekdays and 8 intercity bus roundtrips/day on weekends on a route linking Chico, Oroville, Marysville, and Sacramento, with selected bus trips continuing to/from Stockton, as shown in **Figure 3-11**. Stakeholders representing the Plumas Lake area have also expressed interest in having these intercity buses stop in Plumas Lake. All trips would connect with the Capitol Corridor at Sacramento Valley Station, with some also serving Midtown Sacramento Station (some trips could skip Midtown Sacramento Station if there is no train connection possible at the scheduled time).

As North Valley Rail only proposes to extend 4 roundtrips/day north of Natomas in the mid-term timeframe (as early as 2030), the remaining 6 Valley Rail train roundtrips/day (3 roundtrips/day each for ACE and the *San Joaquins*) on the Sacramento Extension would continue to terminate at Natomas after the opening of North Valley Rail. Therefore, the Chico–Sacramento bus service could be retained (with modifications as needed) after the start of North Valley Rail service to provide connecting bus service for the train slots terminating at Natomas.

Figure 3-11: Chico–Sacramento Intercity Bus Route



Source: *Chico to Sacramento Inter-City Transit Strategic Plan* (January 4, 2022).

- **Sacramento International Airport connection.** When the Valley Rail Program extends train service from Stockton up to Natomas via the UP Sacramento Subdivision, new bus service at the Natomas terminal would provide a first-mile/last-mile connection to/from Sacramento International Airport (“SMF”) for airport users and workers. With North Valley Rail, some of the Natomas trains would be extended further north into the North Valley, resulting in new southbound train arrivals and northbound train departures at Natomas. To serve North Valley passengers on these trains, the SMF bus service could therefore be adjusted and/or expanded to provide better connections to SMF for southbound trains and from SMF for northbound trains.

3.7.6 Sacramento Valley Station and Downtown Sacramento

As discussed in **Section 3.4.5**, Caltrans is currently leading a study to evaluate a potential direct connection to Sacramento Valley Station. Before such a connection is established, North Valley passengers would still have two primary options for making connections to/from Sacramento Valley Station, the various transit services available there, and the surrounding areas of Downtown Sacramento:

- **Old North Sacramento Station.** The planned Valley Rail station in Old North Sacramento would be located in proximity to an existing light rail station (Globe Avenue) on the SacRT Blue Line, with a platform-to-platform walking distance of approximately 1,000–1,250 feet. The Blue Line would take passengers directly to/from the heart of Downtown Sacramento, including key destinations such as Golden 1 Center and Capitol Mall. Passengers coming from or headed to Sacramento Valley Station would be able to do so through a second transfer via the Gold Line or Green Line anywhere along the shared light rail corridor through Downtown along 7th Street/8th Street, O Street, and Quill Alley.
- **Midtown Sacramento Station.** The planned Valley Rail station in Midtown Sacramento would be within 1–2 blocks of SacRT bus service on Route 62, which provides a direct connection to/from Downtown Sacramento and Sacramento Valley Station. Walking distances would be on the order of 750 feet or less between platform and bus stop, and SacRT has also indicated the possibility of enhanced peak-period frequency on this route (e.g., every 15 minutes) to better facilitate transfers.

3.8 Estimated Operations and Maintenance Costs

The mid-term service vision illustrated in **Figure 3-7** shows a daily service for North Valley Rail consisting of 3 intercity roundtrips and 1 commuter roundtrip.⁽¹⁰⁾ The commuter roundtrip and 2 of the intercity roundtrips—the one between Chico and Stockton San Joaquin Street and the one between Chico and Union City—would be operated as ACE trains, while the remaining intercity roundtrip would be operated as a *San Joaquins* train. CalSTA has requested that all existing and new passenger rail service employ cost reduction strategies for operations. For planning purposes, the current O&M cost model for the ACE service was used as a baseline to establish the O&M estimates for the expansion of service from Natomas to Chico.

The methodology for estimating future O&M costs does not represent a detailed financial analysis of fixed and variable costs; however, an effort has been made to develop a preliminary evaluation of fixed and variable costs that are likely to increase as a result of the service expansion to Chico. The general approach involves first establishing the current O&M costs.

After establishing the existing costs, adjustments are applied as needed to the fixed and variable cost elements in each cost model to reflect future service expansions. Future costs are estimated for both a “Future Baseline”

(10) On weekends and holidays, the “commuter” roundtrip would be operated as an “intercity” service.

scenario (without the Project) and “Future with Project” scenario to isolate the incremental effect of the project (i.e., North Valley Rail). The Future Baseline scenario includes the two extensions currently being implemented—the Merced Extension (Lathrop to Merced) and Sacramento Extension (Stockton to Natomas)—and the planned service to/from Union City. For the future scenarios, all roundtrips are assumed to operate daily (i.e., 365 days/year).

In terms of the types of adjustments applied to the existing costs, most fixed costs were increased by 22 percent for the Future Baseline scenario and by 24 percent for the Future with Project scenario to reflect the expanded future operations. In the case of the Future with Project scenario, the slightly larger increase (2 percent) in fixed costs over the Future Baseline scenario covers the expansion from Natomas north into the North Valley.

Variable costs related to train operations and bus shuttles were increased proportionate to the increase in train-miles.⁽¹¹⁾ Assumptions were made regarding new management personnel required to staff the expanded operations. Station maintenance costs were increased by the number of stations, and insurance costs were boosted in relation to ridership, reflecting the greater exposure to risk. Rail maintenance facility expenses were grown to account for the costs of maintaining more trainsets and, for the Future with Project scenario, to accommodate a new layover facility in Chico.

Based on the results of the O&M cost model, North Valley Rail would result in an increase of 221,900 annual train-miles and \$24.0 million in annual O&M costs (in 2023 dollars) over the Future Baseline scenario. More information on the O&M cost estimates is provided in **Appendix C** for reference.

3.9 Safety and Security

Like existing ACE and *San Joaquins* services, North Valley Rail would have passenger service agents aboard trains to check tickets and prevent fare evasion. For incident response, SJRRC/SJPA typically relies on local law enforcement and would coordinate closely with municipalities along the route to develop agreements to help procure the use of on-site security.⁽¹²⁾ In addition, closed-circuit television (“CCTV”) cameras will be strategically placed and combined with active monitoring to prevent intrusion. Fencing will also be provided at stations, the layover facility, and other vulnerable areas along the corridor to keep out trespassers. The existing budgets for SJRRC and SJPA include costs associated with these security services and safety programs for the existing ACE and *San Joaquins* services, and the O&M cost model (see **Section 3.8**) includes an increase of approximately \$550,000 (in FY23/24 dollars) in the budget for these services and programs as part of North Valley Rail. Closer to the actual start of service, SJRRC/SJPA staff would also conduct local outreach to businesses and other parties near future stations to verify specific safety and security concerns and needs.

(11) A train-mile represents a train moving one mile. A train running 200 miles, for example, generates 200 train-miles.

(12) For example, SJRRC has a professional services agreement with a private security contractor to include unarmed guards and physical patrols at the Downtown Stockton (Cabral) station, ACE Rail Maintenance Facility, Lathrop–Manteca station, and the Tamien Yard train layover sidings in San Jose. This agreement includes as-needed services for the other ACE-owned stations, while also providing a security presence for the passengers, train crews, and station staff during operational service and overwatch for facilities and equipment during non-operational hours.

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Chapter 4

Infrastructure Improvements

This chapter describes the infrastructure improvements specifically required for the passenger service, including the stations and layover facility, as well as a preliminary set of potential track improvements within the corridor identified by the Project Team. The estimated capital costs associated with these infrastructure improvements is also discussed in this chapter.

- **4.1 Station and Layover Facility Improvements**
- **4.2 Corridor Improvements**
- **4.3 Cost Estimate**

4.1 Station and Layover Facility Improvements

This subsection describes the initial design concepts for each of the four proposed stations. While each of the stations is unique, the main improvements at each station are consistent across the Project and include a passenger loading platform, passenger access facilities, station area parking, a passenger pick-up/drop-off area, and connecting transit facilities (e.g., bus stops). Each station includes track improvements for train access to/from the platform, and for stations with a center (island) platform, grade-separated pedestrian access is also included. All stations will be designed in accordance with the current version of the SJRRC Valley Rail Station Design Guidelines, including station access priority for active transportation (walking/biking) and connecting transit services.

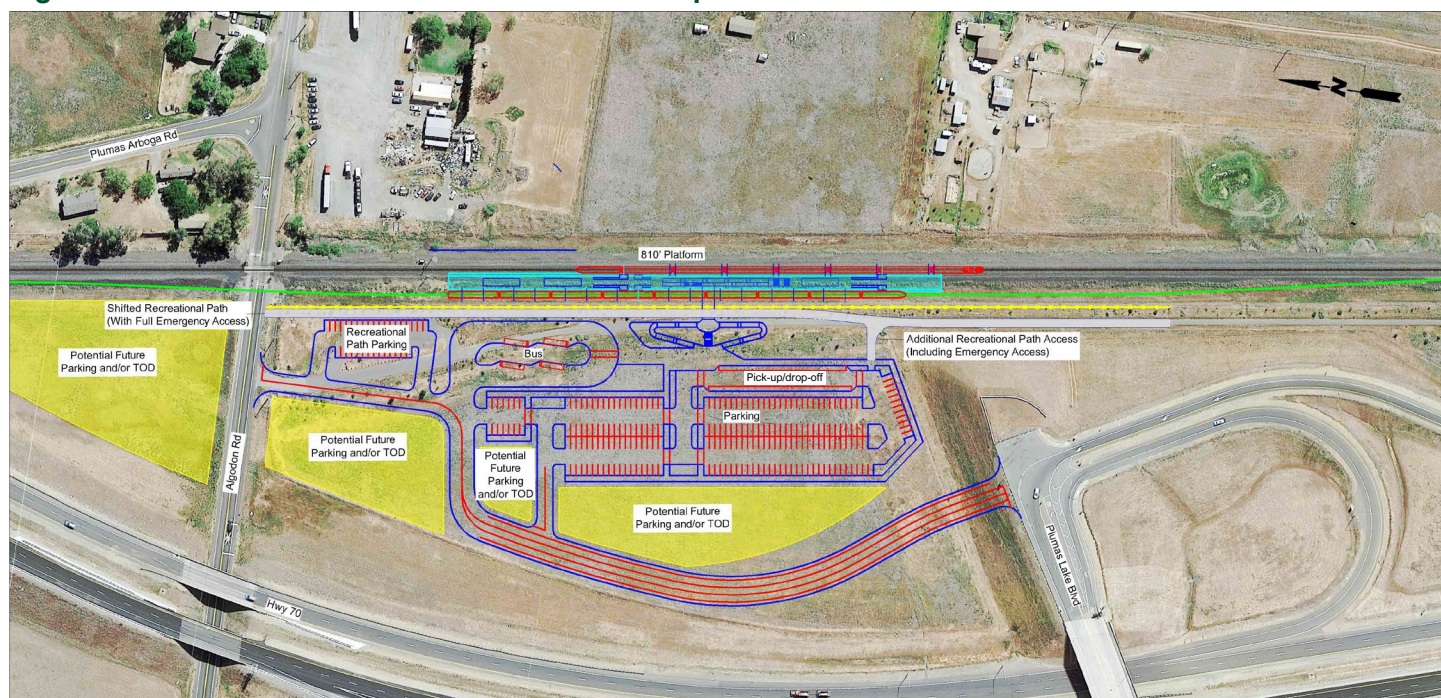
This subsection also describes the proposed layover facility in Chico and the proposed improvements at the planned Natomas Station.

4.1.1 Plumas Lake Station

An initial site plan and visual simulations of the proposed Plumas Lake station are provided in **Figure 4-1** and **Figure 4-2**.

The station would be located in unincorporated Yuba County at the northern end of the currently built-out portion of the Plumas Lake community, along the east side of SR 70 just north of the Plumas Lake Boulevard interchange. Significantly more development in the Plumas Lake community is planned north of the station location, which would result in the station being more centrally located within the overall development. An 810-foot-long center loading platform would be constructed along the west edge of the existing single main track, and a new station siding would be constructed for the west platform face. Ancillary facilities (bus station, parking, and passenger pick-up/drop-off areas) would be provided on the west side of the station, between the platform and SR 70. Access to/from the platform would be provided by an underground pedestrian tunnel linking the west-side station plaza with the platform.

Figure 4-1: Plumas Lake Station – Site Plan Concept



Source: AECOM.

Figure 4-2: Plumas Lake Station – Visual Simulations



Source: AECOM.

Station access would primarily be provided via a new access road tying into Plumas Lake Boulevard opposite the existing on- and off-ramps for northbound SR 70. This access road would continue north and tie into Algodon Road/Plumas–Arboga Road for alternative local access to/from the north.

The Bear River Habitat Trail, a shared-use recreational path running along the west side of the UP ROW between Algodon Road/Plumas–Arboga Road in the north and the southern edge of the Plumas Lake community in the south, will be realigned at its northern terminus adjacent to the station, as indicated in **Figure 4-1**. Trail access to/from Algodon Road/Plumas–Arboga Road would continue to be provided and the potential use of the trail for emergency evacuations for the residential portion of Plumas Lake to the south would continue to be maintained. As shown in **Figure 4-1**, an additional spur would be constructed to connect the main trail with the proposed station parking area to further enhance the trail’s function as a potential emergency evacuation route.

4.1.2 Marysville–Yuba City Station

4.1.2.1 North Option

Initial site plans and visual simulations of the North Option for the proposed Marysville–Yuba City Station are provided in **Figure 4-3** and **Figure 4-4**.

The station would be located on the western side of central Marysville between 5th Street and 10th Street, atop the existing levee and embankment carrying the UP Sacramento Subdivision through Marysville. There are three variants for this option currently under consideration, pending further structural analysis of the levee and embankment as described in more detail below:

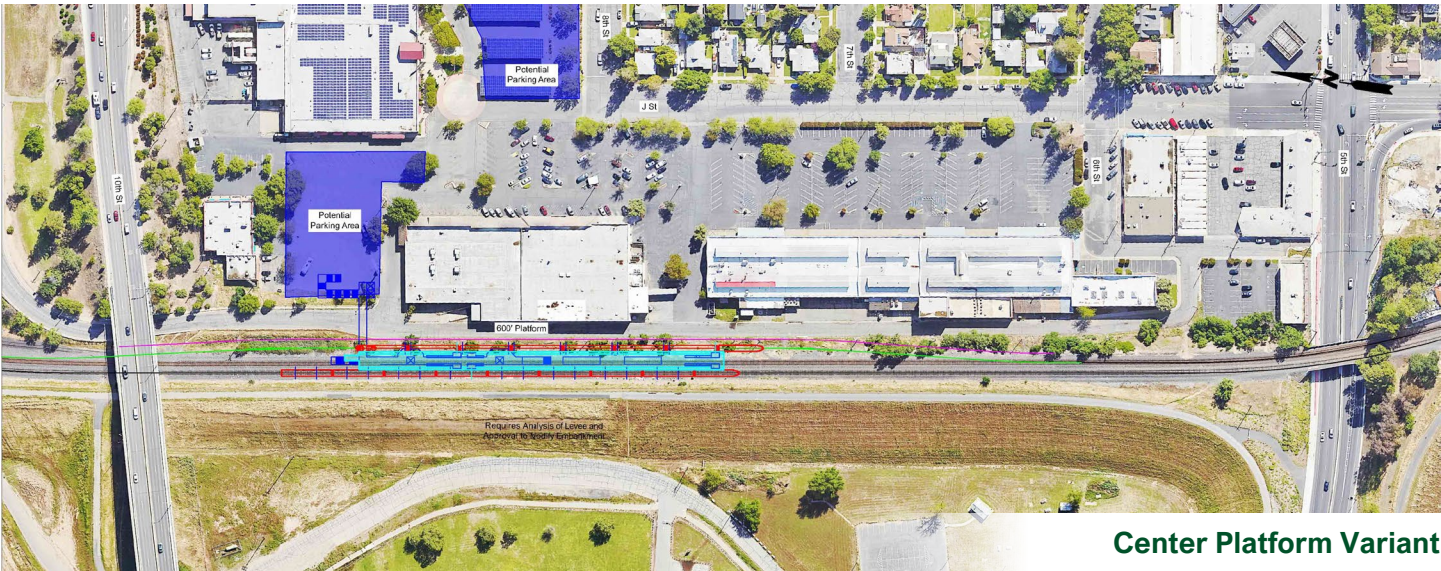
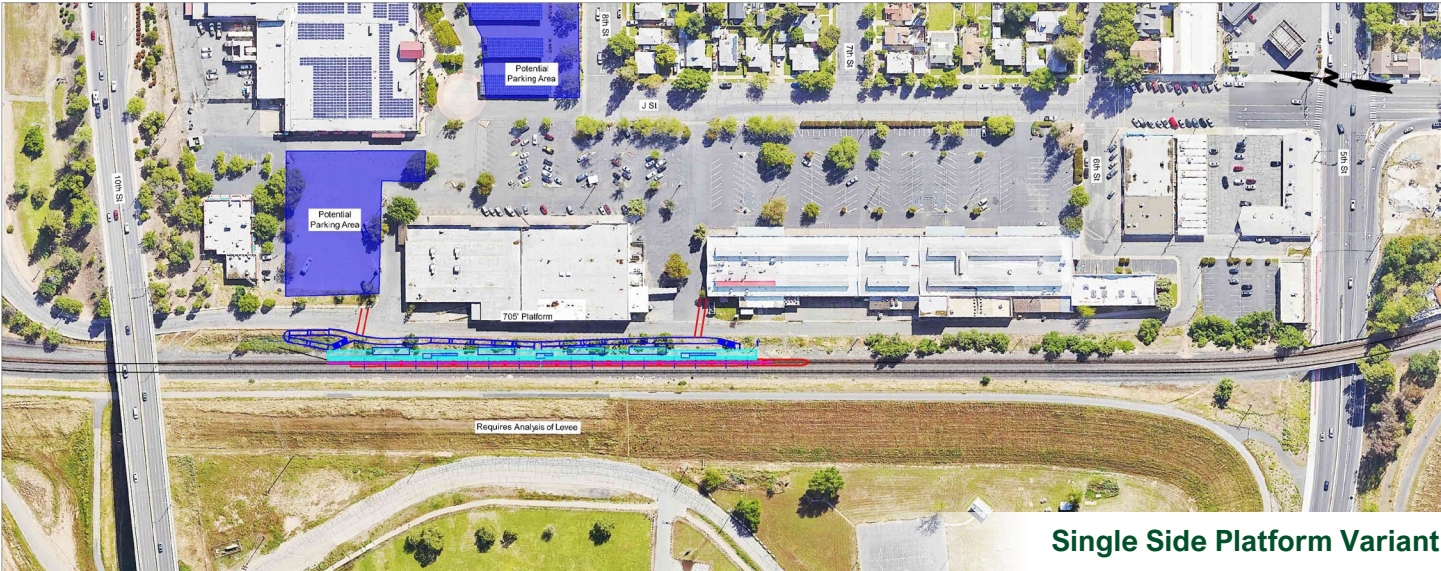
- **Single Side Platform Variant.** This variant would involve construction of a single, 705-foot-long side platform, served by the existing eastern track.⁽¹³⁾ Platform access would be provided directly to/from the east edge of the platform.
- **Center Platform Variant.** This variant would involve construction of a 600-foot-long center platform⁽¹⁴⁾ between the existing western track and a realigned eastern track. Platform access would be provided by a pedestrian bridge over the eastern track, tying in at the north end of the platform.
- **Two Side Platforms Variant.** This variant would be similar to the Single-Side Platform Variant, but would also include construction of a second 705-foot-long side platform for the existing western track. This variant would also provide platform access via a pedestrian bridge over the eastern track, tying in at the north end of the platform.

Access for all variants of the Marysville-Yuba City Station North Option would be provided through the existing retail center and surface parking adjacent to the proposed station site. Further analysis is needed for ancillary facilities, including station parking.

(13) As only one station track would be provided under this variant, adjustments to the conceptual timetable would be needed to avoid the meet between passenger trains at this station.

(14) Because of limited space between the northern (10th Street) and southern (5th Street) overpass structures, the platform would be shorter (600 feet) in this variant than in the side platform variants. This would prevent one or more passenger coaches from having platform access at the station, depending on the location of the locomotive within the consist. In this situation, alighting passengers would be directed to move to the nearest unaffected cars when the train approaches the station.

Figure 4-3: Marysville–Yuba City Station (North Option) – Site Plan Concepts



Source: AECOM.

Figure 4-4: Marysville–Yuba City Station (North Option) – Visual Simulations



Source: AECOM.

Note:

Visual simulations only show the Single Side Platform Variant.

4.1.2.2 South Option

An initial site plan of the South Option for the proposed Marysville–Yuba City Station is provided in **Figure 4-5**.

The station would be located on the southwestern side of central Marysville in close proximity to 3rd Street. As with the North Option discussed above, this option sits atop the existing levee and embankment carrying the UP Sacramento Subdivision through Marysville. This option was recently identified and therefore no variants have been developed to-date, but there is the possibility that variants may be developed prior to the initiation of the Project Approval and Environmental Document/Preliminary Engineering (“PA&ED/PE”) phase, pending further site analysis and structural analysis of the levee and embankment.

An initial layout of this option would involve construction of a single, 705-foot-long side platform served by the existing eastern track. Platform access would be provided directly to/from the east edge of the platform. Further site planning will be undertaken to refine details such as platform placement, location of parking, access facilities, etc.

As the South Option was developed later in the planning process than the North Option, subsequent to the decision to reduce trainset lengths, visual simulations are not available for this option.

Figure 4-5: Marysville–Yuba City Station (South Option) – Site Plan Concept



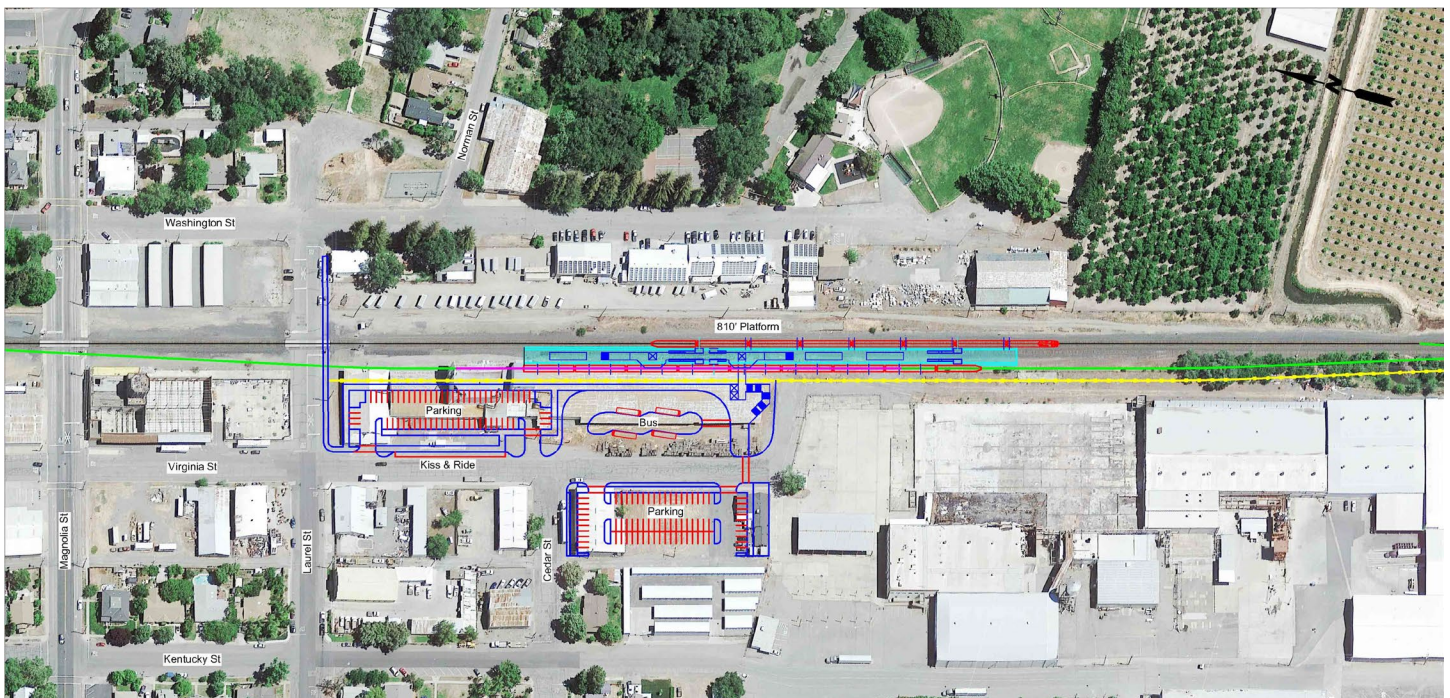
Source: AECOM.

4.1.3 Gridley Station

An initial site plan and visual simulations of the proposed Gridley Station are provided in **Figure 4-6** and **Figure 4-7**.

The station would be located just south of Laurel Street in Downtown Gridley. An 810-foot-long center loading platform would be constructed along the west edge of the existing single main track, and a new station siding would be constructed for the west platform face. Ancillary facilities would be provided on the west side of the station, with access to/from the platform provided by a pedestrian bridge over the western track, tying in near the center of the platform. Station access would be provided by existing local streets, including Virginia Street and Cedar Street.

Figure 4-6: Gridley Station – Site Plan Concept



Source: AECOM.

Figure 4-7: Gridley Station – Visual Simulations



Source: AECOM.

Figure 4-9: Chico Station (Downtown Option) – Visual Simulations



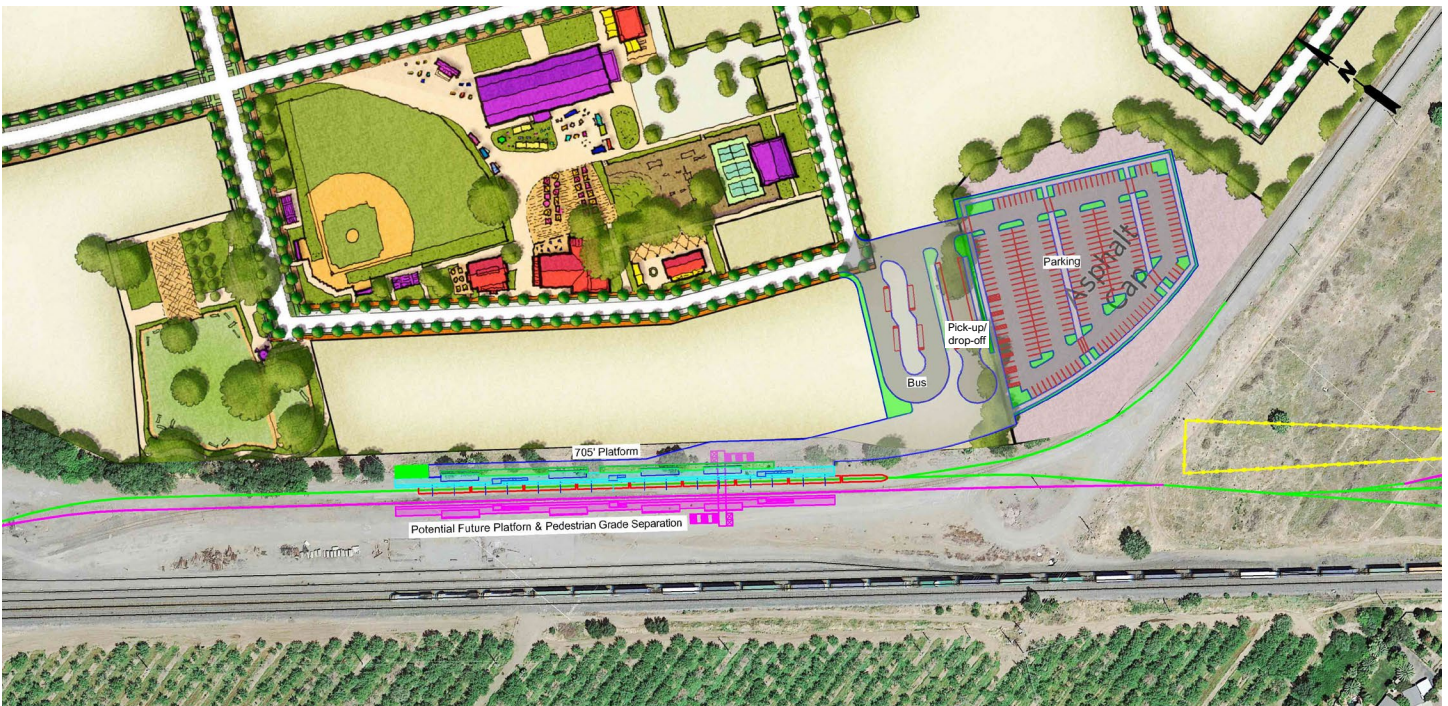
Source: AECOM.

Figure 4-10: Chico Station (Downtown Option) – Adjacent Development

Source: AECOM.

4.1.4.2 Barber Yard Option

An initial site plan and visual simulations of the Barber Yard Option for the proposed Chico Station are provided in **Figure 4-11** and **Figure 4-12**.

Figure 4-11: Chico Station (Barber Yard Option) – Site Plan Concept

Source: AECOM.

Figure 4-12: Chico Station (Barber Yard Option) – Visual Simulations



Source: AECOM.

In this option, the station would be located adjacent to the Barber Yard development site in Chico approximately 1½ miles southeast of Downtown. A single, 705-foot-long side platform would be constructed on the east side of UP's existing Chico Yard, and the existing spur track towards Estes Road would be realigned to serve the new platform. New turnouts would be constructed to allow the realigned spur track to function as a station siding track. Platform access would be provided directly to/from the east edge of the platform. A potential second side platform and associated siding track could be constructed to the west as part of a future phase, with access to/from the second platform provided by a pedestrian grade separation.

Ancillary facilities would be provided on the east side of the station within the Barber Yard development site, including potential parking on top of an existing asphalt cap. Station access would be provided by local streets within the future Barber Yard development site.

4.1.5 Chico Layover Facility

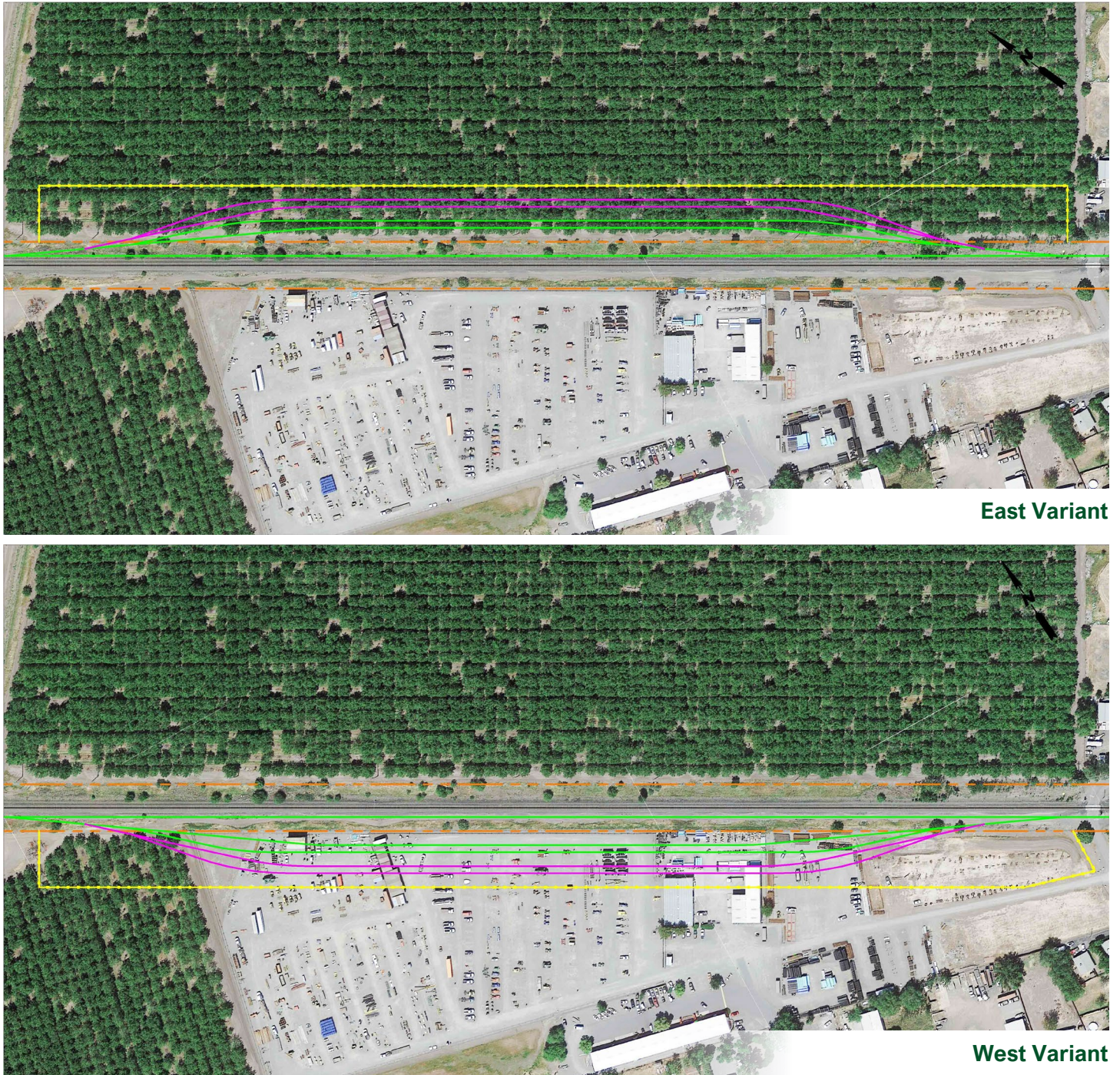
The proposed layover facility is intended for both train layover/storage and general light maintenance activities. As such, the facility includes not only the layover/storage tracks but also various support facilities, including a modular building to support operations staff and access roads along the tracks to perform cleaning, light maintenance, and potential fueling.

4.1.5.1 North Option

Initial site plans of the North Option for the proposed Chico Layover Facility are provided in **Figure 4-13**.

Two variants are proposed—the East Variant and West Variant—depending on which side of the UP ROW is used, but the two are functionally identical. The East Variant would be located on land that is currently used for agriculture, while the West Variant would be located on land that is currently primarily used for industrial support uses. Under both variants, security fencing would be provided around the perimeter of the site.

Both variants would be designed for potential segmentation, with an initial phase of two layover tracks (shown in green) and a subsequent phase with two additional layover tracks (shown in purple). This would accommodate a potential accelerated implementation of 2 daily roundtrips as a first phase of service, if desired. Both variants would tie into the mainline at both the north and south ends.

Figure 4-13: Chico Layover Facility (North Option) – Site Plan Concepts

Source: AECOM.

4.1.5.2 South Option

Initial site plans of the South Option for the proposed Chico Layover Facility are provided in **Figure 4-14**.

The layover facility would be located on land that is currently used for agriculture and a portion of which is associated with the Barber Yard development project. Security fencing would be provided around the perimeter of the site. Like the North Option, the South Option would be designed for potential segmentation, with an initial phase of two layover tracks (shown in green) and a subsequent phase with two additional layover tracks (shown in purple).

The only track connection for the layover facility would be at the northern end, where the layover facility lead would tie into the existing spur track along Estes Road. The southern end of the layover facility would abut Comanche Creek, and a tie-in at the southern end into the existing UP tracks is not proposed. The opposite (southern) bank of the creek is already occupied by existing spur tracks used by Sierra Nevada Brewing Company.

Figure 4-14: Chico Layover Facility (South Option) – Site Plan Concept

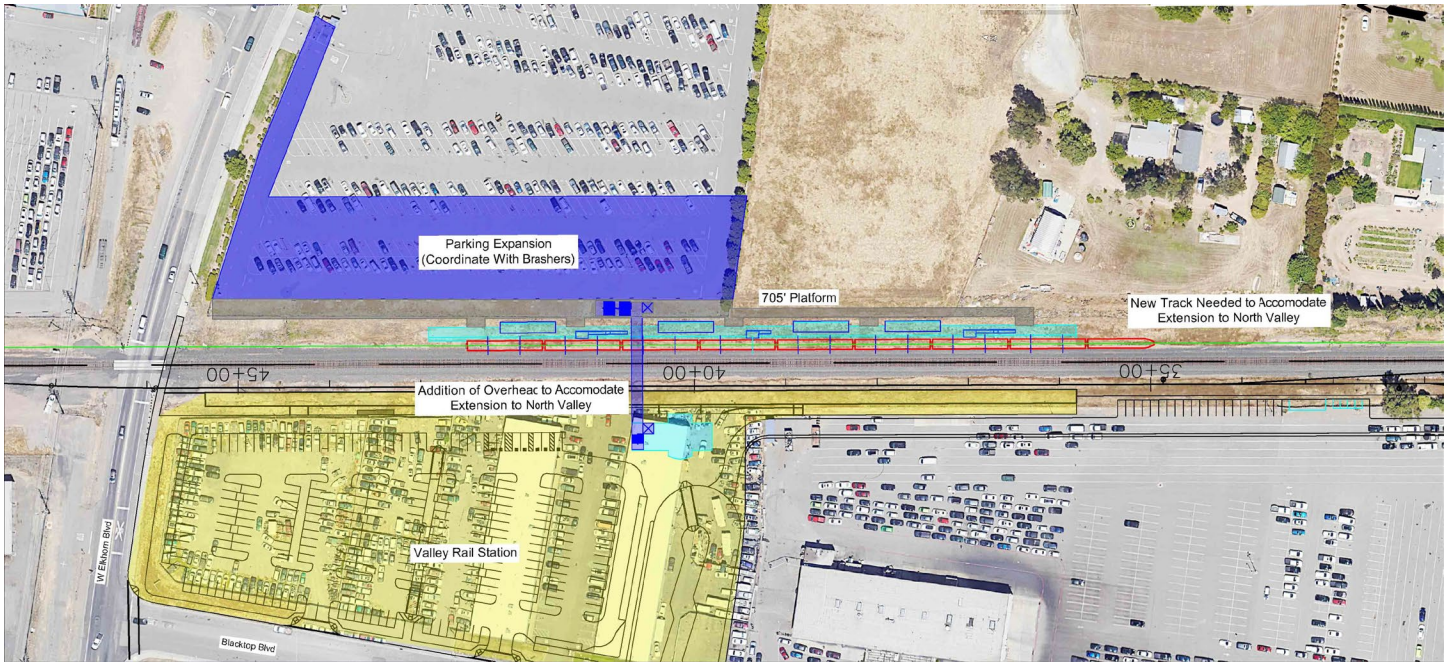


Source: AECOM.

4.1.6 Natomas Station Improvements

An initial site plan of the proposed improvements at the planned Natomas Station (part of the Valley Rail Sacramento Extension) is provided in **Figure 4-15**.

The proposed improvements are designed to allow the station to function as a proper through station (instead of just a terminus station for the Sacramento Extension) and include construction of an additional 705-foot-long side platform and associated platform track along the east side of the existing main track, opposite the initial portion of the station that will be constructed for Valley Rail. A new pedestrian overpass would be constructed to link the two platforms and two sides of the station, and expansion parking would be provided on the east side of the station, pending coordination with current property owners.

Figure 4-15: Natomas Station Improvements – Site Plan Concept

Source: AECOM.

4.2 Corridor Improvements

In order to facilitate passenger rail operations on an existing freight rail corridor, improvements are typically required to allow for train passing and to increase the overall capacity of the corridor to make up for the reduction in the corridor's freight capacity as a result of the addition of passenger trains. In particular, freight trains are typically slower and take longer to accelerate than passenger trains, and improvements such as new or extended sidings allow the corridor to efficiently handle shared use by the two operations (freight and passenger).

The proposed route includes approximately 34 miles along the UP Sacramento Subdivision and 42 miles along the UP Valley Subdivision. While the UP Valley Subdivision carries more freight than the UP Sacramento Subdivision, neither are as busy as the UP Fresno Subdivision. As such, it is anticipated that the infrastructure improvements needed along the extension corridor would be similar to what has been required for the UP Sacramento Subdivision for the current Valley Rail Program (specifically, the Sacramento Extension in terms of new and extended sidings).

The timetable modeling conducted by Caltrans and DB (see [Section 3.4.4](#)) verified that the timetable concept only results in one “meet” of passenger trains at the Marysville–Yuba City station. As such, no additional track infrastructure would be required to facilitate passenger train meets between Natomas and Chico. The timetable modeling was also helpful in identifying train meet locations south of Natomas under the expanded Valley Rail Program, which envisioned 10 roundtrip passenger trains serving Natomas by 2030–2033.

However, a set of potential track improvements at logical locations along the corridor was developed by the Project Team based on the proposed service plan and previous experience working with UP on the Valley Rail Program. These potential improvements are summarized in [Table 4-1](#) and detailed in [Appendix B](#).

This package of improvements has not been endorsed by UP and should only be used as a guide for understanding the magnitude of potential track improvements that may be required for the Project. UP expects to conduct detailed operations modeling of the corridor to identify infrastructure improvements required for the

Project later, in conjunction with the Project's environmental clearance and preliminary design phase. As such, the potential track improvements identified here are preliminary and subject to change.

Table 4-1: Corridor Improvements

Siding name (subdivision)	Existing location (MP)	Existing length (miles)	Proposed improvements			Pro- posed siding length (feet)
			Type and description	Location (MP)	Distance (miles)	
Pleasant Grove (UP Sacramento)	155.9 – 157.1	1.2	Siding extension (south) Three new bridges Upgraded turnout at MP 157.2	154.2 – 155.9	1.7	15,000
Mounkes (UP Sacramento)	172.1 – 173.6	1.5	Siding extension (south) Upgraded turnout at MP 173.6 Also serves Plumas Lake station	169.7 – 172.1	2.4	19,800
Berg (UP Valley)	144.3 – 146.0	1.7	Siding extension (north) Upgraded turnout at MP 144.3	146.0 – 147.3	1.3	15,000
Fagan (UP Valley)	154.1 – 155.7	1.6	Siding extension (north) Upgraded turnout at MP 154.1 Also serves Gridley station	155.7 – 157.8	2.1	19,400
Richvale (UP Valley)	167.2 – 168.8	1.6	Siding extension (north + south) One culvert extension	166.4 – 167.2 168.8 – 169.4	0.8 0.6	15,000
Durham (UP Valley)	—	—	New siding	176.5 – 179.4	2.9	15,000

Source: AECOM.

In addition to the corridor improvements above, selected track improvements are also proposed in conjunction with the station improvements described in **Section 4.1**. These particular improvements are summarized in **Table 4-2**.

Table 4-2: Station Track Improvements

Station or siding (subdivision)	Existing location (MP)	Existing length (miles)	Proposed improvements			Pro- posed siding length (feet)
			Type and description	Location (MP)	Distance (miles)	
Natomas (UP Sacramento)	—	—	New station siding	146.0 – 146.3	0.3	1,500
Marysville–Yuba City (UP Sacramento)	178.4 – 179.4	1.0	Shift mainline track east	178.8 – 179.1	0.3	5,150 (no change)
Chico: Downtown (UP Valley)	—	—	New station bypass track	184.0 – 184.4	0.4	1,700
Chico: Barber Yard (UP Valley)	—	—	Station siding using new and upgraded track	183.0 – 183.5	0.4	2,500

Source: AECOM.

4.2.1 Capital Access Fees

One potential alternative to constructing track improvements, either used partially in combination with some infrastructure improvements or used entirely in lieu of all infrastructure improvements, is the use of capital access fees (CAFs). Under this structure, a fee is paid regularly to the host railroad—in this case, UP—for use of (i.e., “access” to) the existing infrastructure (i.e., “capital”) along the corridor. The host railroad can then use these fees to implement capacity improvements within the corridor or elsewhere throughout their system, at their discretion. Use of CAFs in lieu of infrastructure improvements can substantially lower upfront capital costs and accelerate the timeline for project implementation.

The State prefers to incorporate CAFs where possible, and UP has indicated an openness to consider their use for passenger rail projects, where application of CAFs can be determined to be feasible. The State is currently in discussions with UP separately on exploring CAFs for track improvements associated with rail projects. Determining the feasibility of CAFs for North Valley Rail will require further capacity analysis, engineering evaluation, and detailed rail network operations modeling. In the absence of CAFs, there will be a need to implement some track improvements for North Valley Rail.

4.3 Cost Estimate

Preliminary capital cost estimates were developed for the improvements described in Section 4.1 and Section 4.2 using the following basic unit costs (in 2022 dollars):

- New track at \$15.0 million per mile
- New stations at \$33.6 million per station
- New layover facilities at \$30.0 million per facility

As discussed in Section 3.5, North Valley Rail is envisioned as an extension of services already planned under the expanded Valley Rail Program, new trainsets are not required for the service. Trains for North Valley Rail would already be operating as far north as Natomas under the expanded Valley Rail Program and would simply be extended north to Chico. As such, the preliminary cost estimates provided here do not include costs for rolling stock.

An escalation range was then applied to the initial estimates in 2022 dollars to bring the estimates to year-of-expenditure (YOE) dollars.

Table 4-3 summarizes the resulting preliminary capital cost estimates for the Project, which assumes no applications of CAFs. If UP determines that CAFs are a feasible option, the full application of CAFs (in lieu of all corridor improvements) would reduce total upfront capital costs to the range of \$270.0 million to \$285.5 million, instead of \$500.0 million to \$530.0 million. A partial application of CAFs (i.e., a combination of some CAFs and some corridor improvements) would have costs land in a range somewhere between \$270 million and \$530 million. It should be noted that costs for the station track improvements in Table 4-2 are estimated using the track unit cost but are grouped under the “station and layover facility” costs (as opposed to the “corridor improvements” costs), as they are considered necessary costs for station operation.

Table 4-3: Preliminary Capital Cost Estimate by Project Component

Project component	Estimated cost (millions, 2022 dollars)	Escalation range (millions)	Total cost range (millions, YOY dollars)
Stations and layover facility	\$205.0	\$65.0 – \$80.0	\$270.0 – \$285.0
Stations	\$151.2	\$48.0 – \$59.0	\$199.2 – \$210.2
Station track improvements	\$23.8	\$7.5 – \$9.3	\$31.3 – \$33.1
Layover facility	\$30.0	\$9.5 – \$11.7	\$39.5 – \$41.7
Corridor improvements	\$177.0	\$53.0 – \$68.0	\$230.0 – \$245.0
Total	\$382.0	\$118.0 – \$148.0	\$500.0 – \$530.0

Source: AECOM.

For reference, a breakdown by Project phase for the upper limit of the preliminary capital cost estimate (\$530.0 million) is also provided in **Table 4-4**. The overwhelming majority (\$462 million) of Project costs would be for construction, followed by \$30 million for ROW acquisition and \$38 million in other pre-construction costs.

In terms of ROW acquisition, it is anticipated that corridor improvements, as well as station-related track improvements, would fall entirely within the UP ROW and therefore require no ROW acquisition. However, ROW acquisition outside of the UP ROW will be required to construct ancillary station facilities, including walkways, pedestrian ramps, pedestrian overpasses and underpasses, parking lots, bus loops and depots, bicycle lockers and parking, and plaza spaces. The proposed layover facility will also require ROW acquisition outside of UP ROW.

More information on the capital cost estimates is provided in **Appendix C** for reference.

Table 4-4: Preliminary Capital Cost Estimate by Project Phase

Project phase	Activities	Cost estimate (2022 dollars)
Project Approval and Environmental Document (PA&ED)/ Preliminary Engineering (PE) (30%)	Conduct Environmental Impact Report/Environmental Impact Statement (EIR/EIS) process, including preliminary engineering at a 30% level of design	\$11.6 million
Plans, Specifications, and Estimates (PS&E)	Develop, plans, specifications, and estimates (PS&E) package for construction	\$26.4 million
Right-of-way (ROW)	Purchase ROW	\$30.0 million
Construction	Construct project	\$462.0 million
Total		\$530.0 million

Source: AECOM.

Chapter 5

Ridership Forecasts

A key component of the Strategic Plan was a comprehensive ridership modeling effort to estimate the Project's ridership benefits and assist in preliminary operations planning for the new service, including refining proposed trainset and platform lengths. This effort is described in more detail in this chapter.

- **5.1 Methodology**
- **5.2 Results**
- **5.3 Train Capacity Analysis**

5.1 Methodology

Ridership forecasting for the Strategic Plan was conducted concurrently with ridership forecasting for the following two planning efforts:

- Southern Alameda County Integrated Rail Analysis (“SoCo Rail Study”), a planning-level study led by the Metropolitan Transportation Commission (MTC) to support a proposed extension of ACE service to a second Bay Area terminus at the Union City Intermodal Station, where ACE would connect with the BART system, Dumbarton Corridor buses to/from the Peninsula, and other local transit services.
- Service planning related to the expanded Valley Rail Program providing connectivity to the California High-Speed Rail system’s EOS between Merced and Bakersfield.

Additional updates to model inputs and assumptions were made after completion of the forecasts for the SoCo Rail Study.

The ridership forecasts were developed by combining and synthesizing results from two independent models in a joint-model approach that allows the ridership forecasting effort to take advantage of each individual model’s strengths:

- The AECOM-created ACE Passenger Rail Forecasting Model (“ACE Model”), which is focused on ACE, the *San Joaquins*, Valley Link, and passenger rail in general, and encompasses a larger, megaregional and interregional geography for the expanded ACE and Amtrak *San Joaquins* systems.
- The Alameda County Transportation Commission (ACTC) travel demand forecasting model (“ACTC Model”), which provides finer modeling detail at the (future) Union City end of the combined ACE and *San Joaquins* system.

The ACE Model covers a geographic extent that is well beyond any of the individual urban travel demand models used by MPOs such as BCAG, SACOG, the San Joaquin Council of Governments (SJCOG), or MTC. Those models are typically used within individual metropolitan areas but are not designed to look at large interregional travel spanning multiple metropolitan areas. In the San Francisco Bay Area (specifically, at the future Union City terminus), the joint-modeling approach takes advantage of the ACTC Model’s network assignment procedures to allow for better reporting of transfers (e.g., to/from BART) and other ridership statistics.

Demographic forecasts for the two models were updated to the most recent datasets available from Caltrans’s Transportation Economics Branch (for the ACE Model) and from Plan Bay Area 2040 and SJCOG’s 2018 Regional Transportation Plan (RTP) (for the ACTC Model).

A baseline model was calibrated to observed 2019 ridership for ACE and the *San Joaquins*, and then modified to represent scenarios in 2030 with and without North Valley Rail.⁽¹⁵⁾

The ridership forecasts for the Strategic Plan are preliminary and intended only for the purposes of informing project planning and development. Further ridership analysis will be conducted as part of subsequent environmental clearance for North Valley Rail.

More information on the joint-model approach, base-year model development and validation, post-pandemic ridership trends, and demographic assumptions can be found in **Appendix D**.

(15) The horizon year of 2030 was selected for planning purposes only, to maximize consistency with ridership modeling conducted for the expanded Valley Rail Program and other related projects. Ridership forecasts for a horizon year of 2032 (reflecting the actual expected start of service for the Project) would be very similar to the results presented here for 2030.

5.2 Results

Forecasted annual ridership in 2030 with and without the Project is summarized in **Table 5-1**. Overall, the forecasts show strong ridership potential for the new North Valley Rail service, with ridership increasing by 9 percent (476,200 passengers annually, or approximately 1,305 passengers daily) across the combined ACE and *San Joaquins* network as a result of the extension of the four roundtrips north of Natomas into the North Valley.

Table 5-1: Forecasted Annual Ridership (2030) – Systemwide Summary

	2030 No Build	2030 Build	
		Total	Change (relative to No Build)
Annual ridership	5,336,400	5,812,600	476,200
Train-only (non-transfers)	3,834,800	4,220,100	385,300
Transfers with HSR	1,336,500	1,375,200	38,700
Transfers between ACE and <i>San Joaquins</i>	60,300	69,000	8,700
Transfers with Thruway bus	104,800	148,300	43,500
Average daily ridership	14,620	15,925	1,305

Source: AECOM.

Annual boardings and alightings at each of the four North Valley Rail stations and at the future Natomas Station in 2030 with and without the Project are summarized in **Table 5-2**. Marysville–Yuba City and Chico would each see over 165,000 annual passengers, followed by Plumas Lake and Gridley at around 84,000 annual passengers and 61,000 annual passengers, respectively.

Table 5-2: Forecasted Annual Ridership (2030) – Station-Level Detail

Station	2030 No Build	2030 Build
Chico	—	166,900
Gridley	—	61,400 (a)
Marysville–Yuba City	—	166,000
Plumas Lake	—	83,800
Natomas	225,100	308,700

Source: AECOM.

Notes:

(a) Includes Thruway bus transfers to/from Oroville.

To help characterize general ridership trends at the regional level for the North Valley Rail trains, a market-level flow summary was also prepared by aggregating station-pair ridership into discrete markets based on geography (e.g., Tri-Valley, Sacramento Area, etc.). While **Table 5-1** and **Table 5-2** show how ridership across the combined ACE and *San Joaquins* system changes as a result of North Valley Rail, the market flow summary helps characterize where riders in the North Valley are heading to or from at the interregional level. The market-level flow summary is provided below in **Table 5-3**.

As shown in **Table 5-3**, the largest single market flow is associated with the Sacramento Area. Trips to/from the Sacramento Area represent shorter-distance trips that are able to capture a wide variety of demand, including commuters, day-trip (e.g., business or leisure) travelers, and other passengers. For most markets beyond Sacramento—such as the northern and central San Joaquin Valley and the Bay Area—demand is strong but lower than for the Sacramento Area, reflecting longer travel distances, less frequent service, and/or the added inconvenience of transfers.

Table 5-3: Forecasted Annual Ridership (2030) – Market Flow Summary

Market	Annual passengers (trips)
Internal (within North Valley)	7,000
External (North Valley to/from)	
Sacramento Area	357,600
San Joaquin Valley (North and Central)	34,900
San Francisco Bay Area	24,100
HSR: San Joaquin Valley (South) and Southern California	38,700

Source: AECOM.

5.3 Train Capacity Analysis

In addition to the ridership forecasts, the ridership modeling effort included an analysis of passenger load between adjacent stations served by North Valley Rail trains to identify potential capacity issues related to using different trainset equipment. In order to minimize capital costs for the new service, it is worthwhile to consider designing any new infrastructure, at least in the initial stages, for trainsets shorter than the design standard being used elsewhere in the Valley Rail Program. If desired and warranted by ridership demand, the infrastructure can then be expanded at a later time to the full design standard.

BCAG and SJRRC have already indicated their preliminary intention to move forward with a design for North Valley Rail based on a Bombardier BiLevel trainset with 8 passenger coaches, which is shorter than the maximum length of 10 passenger coaches being assumed at most of the new Valley Rail stations. Based on specific design considerations at each station, the platform length to accommodate an 8-car BiLevel trainset ranges from 705 feet to 810 feet. This decision is consistent with the strategy to accommodate an 8-car BiLevel trainset for the planned platform at the Union City Intermodal Station (that platform is specified to be 745 feet in length).

The exact type of trainset(s) to be used on North Valley Rail is not known at this time, but could consist of one or more models that are currently being considered across the future ACE and *San Joaquins* systems. For the purposes of this train capacity analysis, three trainset types have been evaluated: Bombardier BiLevel (8-car) train with a total capacity of 1,056 passengers; Siemens Venture (7-car) train with a total capacity of 456 passengers; and Stadler FLIRT (3-unit) train with a total capacity of 672 passengers.

A focused link load analysis was conducted for the eight North Valley Rail single-direction trains to quantify potential crowding levels inside trains. For this analysis, screenlines were placed between each adjacent station pair on a given train's route. A screenline represents an imaginary cordon placed at a given location along a transit route, usually for the purpose of evaluating passenger loads and capacity inside transit vehicles as they pass through the screenline.

For example, if a train serves four stations (A, B, C, and D, in that order) and the passenger load ("link load") is desired for the segment of the line between Station B and Station C, a screenline is placed at that location and the ridership is aggregated between the relevant station pairs passing through the screenline. In this case, the link load would consist of passengers going from A to C, from A to D, from B to C, and from B to D. Passengers going from A to B or from C to D do not pass through the screenline and are therefore not counted.

This process can then be repeated by placing screenlines between the remaining adjacent station pairs for the train (i.e., between A and B and between C and D) to calculate the respective link loads at those locations. Taking the highest passenger load across all of the screenlines yields the maximum link load for that train. When planning a transit service, it is useful to compare the maximum link load to the actual capacity of the transit vehicle to

quantify the level of crowding inside the vehicle and confirm that there is sufficient capacity to accommodate the load.

The results of this analysis for the eight North Valley Rail trains (four trains in each direction) are summarized in **Table 5-4**.

Table 5-4: Link Load Analysis

Direction / Train	Origin (northbound)	Maximum link load	Maximum load point (a)	Capacity utilization at maximum link load		
	Destination (southbound)			Bombardier BiLevel (8-car)	Siemens Venture (7-car)	Stadler FLIRT (3-unit)
Northbound						
C03	Merced (new)	167	Midtown Sacramento → Old North Sacramento	16%	37%	25%
N01	Merced (new)	275	Midtown Sacramento → Old North Sacramento	26%	60%	41%
D02	Stockton San Joaquin Street	271	Stockton S. Jqn. St. → Downtown Stockton	26%	59%	40%
W02	Union City	577	Vasco Road → Tracy	55%	127%	86%
Southbound						
W01	Union City	583	Tracy → Vasco Road	55%	128%	87%
D01	Stockton San Joaquin Street	260	Downtown Stockton → Stockton S. Jqn. St.	25%	57%	39%
N06	Merced (new)	226	Old North Sacramento → Midtown Sacramento	21%	50%	34%
C04	Merced (new)	193	Old North Sacramento → Midtown Sacramento	18%	42%	29%

Source: AECOM.

Notes:

- (a) Because the maximum link load reflects an average daily value, the actual load on a given day may be higher or lower due to day-to-day variability and other factors. The maximum link load for most of the eight trains is based on weekend daily ridership, which is forecasted to generally be higher than weekday ridership for the North Valley Rail trains.

As shown in **Table 5-4**, none of the proposed North Valley Rail trains would reach their maximum loads within the North Valley section (i.e., anywhere between Chico and Natomas), although 4 of the trains (C03 and N01 in the northbound direction and N06 and C04 in the southbound direction) would have maximum load points slightly south of Natomas in or near Midtown Sacramento. The other 4 trains would have maximum load points in the Stockton area between Downtown Stockton and Stockton San Joaquin Street (D01 and D02), or on the ACE trunk over the Altamont Pass between Tracy and Vasco Road (W01 and W02). Barring the coupling or decoupling of additional cars or units mid-run while in revenue service, however, the trainset length is ultimately determined by the maximum load point over the entire length of the route, even if that load is not reached within the North Valley segment of the route.

Overall, capacity utilization would be highest on the Siemens Venture trainsets due to lower passenger capacity, with two of the eight trains well above the trainset capacity. With the 3-unit Stadler FLIRT trainsets, one of the trains would almost reach the trainset capacity at 87 percent. The capacity utilization for the Bombardier BiLevel

trainsets would range from 16 percent to 55 percent, but none of the eight trains would exceed the trainset capacity. Based on the results shown in **Table 5-4**, a trainset with 8 Bombardier BiLevel passenger coaches or an alternative trainset type of similar length is sufficient to accommodate the maximum loads of any of the proposed trains.

Chapter 6

Funding and Implementation Strategy

Perhaps the most important result of this Strategic Plan process is the identification of an actionable approach to realize the Project as proposed. This effort includes defining a strategy for funding and executing the Project through the various phases to completion. This strategy is described in more detail in this chapter.

- **6.1 Funding Strategy**
- **6.2 Implementation**
- **6.3 Immediate Next Steps**

6.1 Funding Strategy

The overall approach to identifying funding sources is based on the estimated “upper-limit” preliminary capital cost estimate of \$530 million, as described in **Section 4.3**, with the goal of the funding strategy being to produce an approach that can fully fund this capital budget. However, it is the goal of the Project Team and the State to look at the opportunity to reduce the upfront costs of the Project and accelerate project implementation by exploring the use of CAFs with UP, as discussed in **Section 4.2.1**. If CAFs can be used in lieu of all corridor improvements, the Project’s upfront capital costs could be reduced to \$285 million or less, but further coordination with UP is required to understand if CAFs can be used in lieu of some or all of the corridor improvements. As previously mentioned, determining the feasibility of CAFs for North Valley Rail will require further capacity analysis, engineering evaluation, and detailed rail network operations modeling by UP. Given the uncertainty of this situation, the funding strategy assumes the worst-case scenario of a funding need of \$530 million to fully implement the Project.

While a funding strategy for the entire project is still being explored and refined, a funding strategy for the next Project phase (PA&ED/PE) is well-developed and described further in this subsection. This funding strategy relies on a combination of regional and State-based funding sources for the PA&ED/PE phase so work can continue rapidly following the completion of planning, while then seeking additional State funds plus Federal funds for PS&E, permitting and ROW acquisition, and construction. For these latter phases, the overall split envisioned between State and Federal funding sources is approximately 75% State funds and 25% Federal funds.

In terms of committed funding to-date, no specific funding has been fully committed to the Project beyond State grant funds and other local/regional funds for the planning phase, involving the development of this Strategic Plan. Looking forward, BCAG and its partners are working to identify candidate funding sources for the PA&ED/PE, PS&E, permitting/ROW acquisition, and construction phases, with a solid plan for the full funding already in place for the PA&ED/PE phase, as described above.

The funding strategy and potential funding sources for each remaining Project phase are discussed in more detail in the following subsections.

6.1.1 PA&ED Phase

The next phase of project development is PA&ED, which involves preparation of the requisite environmental documents in accordance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA), as well as supporting preliminary engineering work at a 30% level of design. BCAG is pursuing the full funding for the estimated \$11.6 million for this phase through two primary funding sources:

- **State Rail Assistance (SRA) Program funds.** In regards to this funding program, North Valley Rail will be identified as an “aspiring corridor.”
- **SB 125 Formula Funds.** BCAG will draw upon a portion of their regional formula funds allocated by SB 125 for transit. These funds were authorized by SB 125 in 2023 and are being distributed to MPOs around the state.

6.1.2 PS&E Phase

For the PS&E phase (currently estimated at a cost of \$26.4 million), further utilization of SB 125 regional formula funds is being considered along with State funding sources, including SRA, the Solutions for Congested Corridors Program (SCCP), the Trade Corridor Enhancement Program (TCEP), and State Transportation Improvement Program (STIP) funds.

With the completion of a NEPA environmental document during the PA&ED phase, Federal funding sources would also enter the potential funding mix during the PS&E phase. BCAG is specifically targeting the RAISE (Rebuilding American Infrastructure with Sustainability and Equity) discretionary grant program as a potential source given that BCAG has already submitted a previous RAISE grant application for the Project. While their first attempt at RAISE funding was not successful, the Project performed well and has been encouraged to re-apply by officials at the United States Department of Transportation.

Other federal funding sources that may be considered are the Consolidated Rail Infrastructure and Safety Improvements (CRISI) Program, Multimodal Project Discretionary Grant (MPDG) Program, the Federal–State Partnership (FSP) for Intercity Passenger Rail Grant Program, and the Corridor Identification and Development (“Corridor ID”) Program.

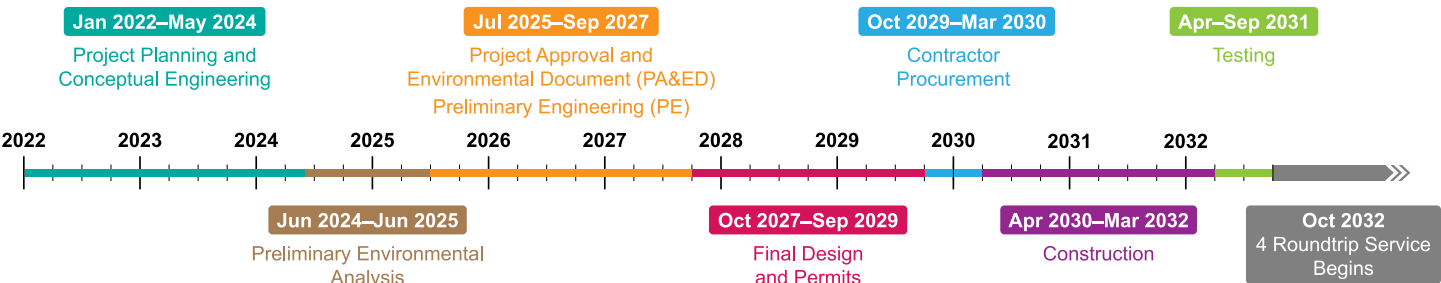
6.1.3 Permitting/ROW Acquisition and Construction Phases

Following the PS&E phase, the remaining phases of the Project include permitting/ROW acquisition and construction. Taken together the capital costs for these phases are estimated at \$492 million. In terms of State funding, applying for a statewide Transit and Intercity Rail Capital Program (TIRCP) grant will be pursued. Other State funds to be considered during these phases include SRA, TCEP, SCCP, and STIP, while Federal funds could include RAISE, CRISI, and, if still available at the time, funds from the MPDG, FSP, and Corridor ID programs. Additionally, FTA’s Capital Investment Grants (CIG) Small Starts program could also be considered if CAFs can bring the upfront cost down under the \$400 million project cost cap for that program. Additionally, if SB 125 regional formula funds are renewed beyond the current allocations, this source will also be considered.

6.2 Implementation

Figure 6-1 shows the overall schedule for project implementation by major phase. Confirmation of schedule durations and milestones is subject to additional coordination with project stakeholders during project development. Based on current knowledge, the expected service start date is sometime around October 2032.

Figure 6-1: Project Schedule by Phase



Source: AECOM.

The immediate next phase for the Project is PA&ED, which involves preparing the project’s environmental document (EIR/EIS) and conducting preliminary engineering to support the environmental document. For this phase, SJRRC will serve as the lead agency, with SJJPA participating as a Responsible Agency under CEQA (i.e., with discretionary approval authority over relevant portions of the project). This approach is similar to the approach being undertaken elsewhere for other components of the larger Valley Rail Program.

BCAG will continue to participate by managing the funds utilized for the PA&ED phase, including conducting the procurement for the consultants, as well as conducting the day-to-day management of the work being produced.

Other specific areas of project implementation are discussed in more detail below.

6.2.1 Governance and Operations

SJRRC serves as the owner, operator, and policy-making body for the ACE service. SJRRC was created in 1995 through a joint powers agreement between San Joaquin County and the county's seven cities (Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, and Tracy), with the express purpose of improving existing rail service, establishing a rail system in San Joaquin County, and pursuing agreements for commuter rail service with Alameda County and Santa Clara County. SJRRC subsequently pursued a separate joint powers agreement with the Alameda County Congestion Management Agency (ACCMA) and the Santa Clara Valley Transportation Authority (VTA) in 1997 to establish the Altamont Commuter Express Joint Powers Authority ("ACE JPA"). ACE service then commenced a year later in 1998.

Since 2013, SJRRC has also served as the managing agency for SJJPA, which manages the Amtrak *San Joaquins* service (since June 2015). The SJJPA itself was established in 2012 to take over administration and management of the *San Joaquins* service from the State, following the passage of Assembly Bill (AB) 1779 with the sponsorship and support of local and regional agencies throughout the *San Joaquins* corridor. AB 1779 defined the composition of the SJJPA, extended the time for executing an interagency transfer agreement with Caltrans to 2015, and required that the transfer result in administrative or operating cost reductions. Governance and management of the *San Joaquins* was transferred to the SJJPA on July 1, 2015.

Currently, SJRRC's Board of Directors consists of six full-voting members from San Joaquin County and two special-voting members from Alameda County. SJJPA's Board of Directors consists of 10 members—one from each of the member agencies: Alameda County, Contra Costa Transportation Authority (CCTA), Fresno Council of Governments ("Fresno COG"), Kings County Association of Governments (KCAG), Madera County Transportation Commission ("Madera CTC"), Merced County Association of Governments (MCAG), Sacramento Regional Transit, SJRRC, Stanislaus Council of Governments ("StanCOG"), and Tulare County Association of Governments (TCAG).

Current operations for ACE and the *San Joaquins* are contracted out to Herzog Transit Services, Inc. and to Amtrak, respectively.

As ACE and the *San Joaquins* expand into new geographies as part of the larger Valley Rail program—including the North Valley—it may be necessary to consider restructuring the SJRRC and SJJPA Boards of Directors by adding or reallocating seats to improve committee representation for these new service areas, particularly if the program relies on local sales taxes or other local funding sources from these areas to support the capital or operating budgets for the new service.

6.2.2 Fleet Considerations

As discussed in [Section 3.5](#), the exact fleet to be used for North Valley Rail will depend on several factors and is not yet known at this time with certainty. Because North Valley Rail is being planned as an extension of Valley Rail service north from Natomas, the trainsets required to operate the service would already be operating as part of Valley Rail. Future fleet planning for the expanded Valley Rail Program is currently being led by the State (via CalSTA and Caltrans), including both funding and procuring of new trainsets. SJRRC/SJJPA will continue to play an important role as an agency partner and a recipient of new rolling stock from that process, and both BCAG and SJRRC/SJJPA should continue close coordination efforts with the State on outlining an overarching fleet strategy that includes North Valley Rail and the rest of the future service expansions.

For reference, a fleet based on locomotive-hauled passenger coaches would cost approximately \$48 million per trainset, including \$40 million for the passenger cars (at \$5 million per car) and \$8 million for the locomotive. On an individual basis, some of the expansions within the expanded Valley Rail Program may require several trainsets

for revenue operations, or an investment on the order of \$200 million or more. Given these costs, a joint procurement process spearheaded at the State level, whereby trainsets are procured jointly as part of a single, larger contract (e.g., one that covers the overall Valley Rail program or includes other service expansions elsewhere in the state), could offer a major opportunity for cost efficiencies over individual (agency-driven) procurement due to economies of scale.

6.2.3 Permits and Approvals

In addition to environmental clearance, various permits and other approvals will be required for the project, typically from State and Federal agencies with jurisdiction in areas such as the following:

- Biological environment, such as the United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service, and the California Department of Fish and Wildlife (CDFW)
- Natural waterways and other State lands, such as the California State Lands Commission (SLC)
- Civil infrastructure and systems, such as the United States Army Corps of Engineers (USACE), the United States Department of Defense, the United States Coast Guard (USCG), the California Department of Water Resources (DWR), the State Water Resources Control Board (SWRCB), and the Central Valley Flood Protection Board (CVFPB)
- Historic resources, such as the California Office of Historic Preservation (OHP)
- Tribal resources, such as the Native American Heritage Commission (NAHC)
- Railroads and utilities, such as the California Public Utilities Commission (CPUC)
- Roadways and highways, such as Caltrans
- Environmental remediation, such as the California Department of Toxic Substances Control (DTSC)

Similar permits and approvals will likely be required at the local/regional levels (e.g., from counties and municipalities for encroachment permits), as well as from other parties such as UP and various private and public utilities (e.g., for utility relocation). These permits and approvals will be identified during the PA&ED phase as part of preparation of the environmental document.

6.3 Immediate Next Steps

A fundamental step in moving the North Valley Rail project forward is ensuring that the project is identified within key planning documents. Throughout the development of this Strategic Plan, the Project Team coordinated closely with the State to ensure that the project was identified in the Draft 2023 CSRP. Coordination will continue with the State to ensure consistency between this Strategic Plan and the Final CSRP.

In terms of funding, BCAG, in coordination with SJRRC, SJJPA, and other project partners, has begun working to secure funds for the PA&ED phase. Securing funding in the near-term is a high-priority so the project can maintain its momentum. Approximately \$11.6 million in funding is needed to cover this phase, which would include clearance under both CEQA and NEPA and 30% preliminary engineering.

SJRRC, SJJPA, and BCAG will also continue coordination on project implementation with external parties and stakeholders, including UP and local/regional agencies.

As part of the PA&ED phase, ridership forecasts will be refined, focusing on the more definitive project description and considering a longer-term horizon year and the impact of recent trends (as a result of data on the post-pandemic work and travel patterns and adjustments to demographic growth projections in California).

Chapter 7

Fare Strategy

This chapter describes the existing fare structures for ACE and the *San Joaquins*, as well as existing transit fares within the North Valley corridor. This is followed by a high-level analysis of potential fares for North Valley Rail (based on existing ACE and *San Joaquins* fares) and a discussion of relevant strategies for consideration when it comes time establish fares for the new service.

- 7.1 Existing Fare Structure and Current Planning Efforts
- 7.2 Fare Strategy Considerations
- 7.3 Sample Fares
- 7.4 Farebox Recovery and Funding Operations

7.1 Existing Fare Structure and Current Planning Efforts

This section describes the existing fare structures for both ACE and the *San Joaquins*, as well as existing transit fares within the North Valley corridor. Current planning efforts related to the ACE and *San Joaquins* fare structures are also discussed.

7.1.1 ACE

7.1.1.1 Overview

ACE operates on a “first come, first served” basis without reserved seating. The fare structure is roughly zone-based, with five basic fare buckets (one-way, round-trip, 10-trip, 20-trip, and monthly). Current ACE fares by station pair are summarized in **Table 7-1**.

As shown in **Table 7-1**, fare pricing increases with distance but also incorporates some zone-based pricing, with stations in the Tri-Valley (Pleasanton, Livermore, and Vasco Road) and in Santa Clara County (San Jose, Santa Clara, and Great America) each treated as station groups or zones and sharing a uniform fare. For example, a passenger traveling to or from the Tri-Valley zone will be assessed the same fare whether the Tri-Valley end of their trip is at Pleasanton, Livermore, or Vasco Road. The same holds for passengers traveling to or from the Santa Clara zone. For passengers traveling between the Tri-Valley and Santa Clara zones, there are nine different station pairs (18 total, if considering both directions of the service) that all share the same fares.

Table 7-1 also shows that there is a total of 10 different pricepoints across the system, with one-way fares ranging from \$4.75 to \$15.50. These pricepoints can be mapped across the station pairs to better illustrate the differences between specific station groups or zones. This analysis is shown in **Table 7-2**.

As shown in **Table 7-2**, pricepoints are lowest for fares within the Tri-Valley and Santa Clara zones (Pricepoint A), gradually increasing until reaching the maximum pricepoint (Pricepoint J) for trips between Stockton and the Santa Clara zone. Due to the zonal delineation and other considerations, the escalation in pricepoints is not directly proportional to trip distance. For example, trips between Tracy and Pleasanton (approximately 30 miles one-way) are assigned Pricepoint C and are cheaper than trips between Stockton and Tracy (approximately 23 miles one-way), which are assigned Pricepoint D. Also of interest is the “jump” in fares between Pricepoint D (\$6.50 one-way fare) and Pricepoint E (\$10.25 one-way fare).

Tickets for ACE may be purchased on mobile devices via ACE’s mobile ticketing platform (the ACE Rail mTickets app), and passengers are required to activate their ticket prior to boarding the train. Tickets may also be purchased in paper form from approved ACE ticket vendors and at many ACE stations such as Stockton, Lathrop–Manteca, Tracy, Livermore, Pleasanton, Fremont, Great America, and San Jose. Paper tickets (except for monthly passes) must be validated before boarding the train.

Passengers who purchase 11 consecutive monthly passes also qualify for a free monthly pass for the 12th month through ACE’s Loyalty Reward Program.

In terms of commuter benefits programs, ACE accepts payments via transit benefit cards and Wageworks vouchers. Clipper, the Bay Area’s regional transit card, is not accepted on ACE.

Table 7-1: Existing ACE Fare Structure – Station-Pair Detail

Origin station and ticket type ↓ ↓ ↓ ↓		Fares									
		← Destination station / MP →									
		Downtown Stockton	Lathrop–Manteca	Tracy	Vasco Road	Livermore	Pleasanton	Fremont	Great America	Santa Clara	San Jose
		SKT	LTM	TRA	VAS	LIV	PLS	FMT	GAC	SCC	SJC
		85.6	74.8	62.3	42.0	39.1	32.5	19.5	6.9	2.6	0.0
Downtown Stockton	One-way		\$5.25	\$6.50	\$10.75	\$10.75	\$10.75	\$12.25	\$15.50	\$15.50	\$15.50
	Round-trip		\$6.50	\$12.25	\$16.75	\$16.75	\$16.75	\$22.00	\$27.50	\$27.50	\$27.50
	10-trip		\$26.25	\$52.00	\$75.00	\$75.00	\$75.00	\$98.00	\$120.00	\$120.00	\$120.00
	20-trip		\$52.25	\$93.25	\$131.50	\$131.50	\$131.50	\$170.50	\$210.25	\$210.25	\$210.25
	Monthly		\$97.50	\$168.75	\$241.75	\$241.75	\$241.75	\$312.75	\$386.00	\$386.00	\$386.00
Lathrop–Manteca	One-way	\$5.25		\$6.25	\$10.25	\$10.25	\$10.25	\$11.75	\$14.50	\$14.50	\$14.50
	Round-trip	\$6.50		\$11.75	\$16.00	\$16.00	\$16.00	\$20.25	\$26.00	\$26.00	\$26.00
	10-trip	\$26.25		\$50.00	\$73.00	\$73.00	\$73.00	\$94.00	\$115.00	\$115.00	\$115.00
	20-trip	\$52.25		\$88.25	\$125.75	\$125.75	\$125.75	\$163.00	\$201.00	\$201.00	\$201.00
	Monthly	\$97.50		\$161.25	\$231.25	\$231.25	\$231.25	\$299.75	\$370.00	\$370.00	\$370.00
Tracy	One-way	\$6.50	\$6.25		\$6.25	\$6.25	\$6.25	\$10.25	\$11.75	\$11.75	\$11.75
	Round-trip	\$12.25	\$11.75		\$11.75	\$11.75	\$11.75	\$16.00	\$20.25	\$20.25	\$20.25
	10-trip	\$52.00	\$50.00		\$50.00	\$50.00	\$50.00	\$73.00	\$94.00	\$94.00	\$94.00
	20-trip	\$93.25	\$88.25		\$88.25	\$88.25	\$88.25	\$125.75	\$163.00	\$163.00	\$163.00
	Monthly	\$168.75	\$161.25		\$161.25	\$161.25	\$161.25	\$231.25	\$299.75	\$299.75	\$299.75
Vasco Road	One-way	\$10.75	\$10.25	\$6.25		\$4.75	\$4.75	\$6.25	\$10.25	\$10.25	\$10.25
	Round-trip	\$16.75	\$16.00	\$11.75		\$6.25	\$6.25	\$11.75	\$16.00	\$16.00	\$16.00
	10-trip	\$75.00	\$73.00	\$50.00		\$30.00	\$30.00	\$50.00	\$73.00	\$73.00	\$73.00
	20-trip	\$131.50	\$125.75	\$88.25		\$50.50	\$50.50	\$88.25	\$125.75	\$125.75	\$125.75
	Monthly	\$241.75	\$231.25	\$161.25		\$93.50	\$93.50	\$161.25	\$231.25	\$231.25	\$231.25
Livermore	One-way	\$10.75	\$10.25	\$6.25	\$4.75		\$4.75	\$6.25	\$10.25	\$10.25	\$10.25
	Round-trip	\$16.75	\$16.00	\$11.75	\$6.25		\$6.25	\$11.75	\$16.00	\$16.00	\$16.00
	10-trip	\$75.00	\$73.00	\$50.00	\$30.00		\$30.00	\$50.00	\$73.00	\$73.00	\$73.00
	20-trip	\$131.50	\$125.75	\$88.25	\$50.50		\$50.50	\$88.25	\$125.75	\$125.75	\$125.75
	Monthly	\$241.75	\$231.25	\$161.25	\$93.50		\$93.50	\$161.25	\$231.25	\$231.25	\$231.25
Pleasanton	One-way	\$10.75	\$10.25	\$6.25	\$4.75	\$4.75		\$6.25	\$10.25	\$10.25	\$10.25
	Round-trip	\$16.75	\$16.00	\$11.75	\$6.25	\$6.25		\$11.75	\$16.00	\$16.00	\$16.00
	10-trip	\$75.00	\$73.00	\$50.00	\$30.00	\$30.00		\$50.00	\$73.00	\$73.00	\$73.00
	20-trip	\$131.50	\$125.75	\$88.25	\$50.50	\$50.50		\$88.25	\$125.75	\$125.75	\$125.75
	Monthly	\$241.75	\$231.25	\$161.25	\$93.50	\$93.50		\$161.25	\$231.25	\$231.25	\$231.25
Fremont	One-way	\$12.25	\$11.75	\$10.25	\$6.25	\$6.25	\$6.25		\$6.25	\$6.25	\$6.25
	Round-trip	\$22.00	\$20.25	\$16.00	\$11.75	\$11.75	\$11.75		\$11.75	\$11.75	\$11.75
	10-trip	\$98.00	\$94.00	\$73.00	\$50.00	\$50.00	\$50.00		\$50.00	\$50.00	\$50.00
	20-trip	\$170.50	\$163.00	\$125.75	\$88.25	\$88.25	\$88.25		\$88.25	\$88.25	\$88.25
	Monthly	\$312.75	\$299.75	\$231.25	\$161.25	\$161.25	\$161.25		\$161.25	\$161.25	\$161.25
Great America	One-way	\$15.50	\$14.50	\$11.75	\$10.25	\$10.25	\$10.25	\$6.25		\$4.75	\$4.75
	Round-trip	\$27.50	\$26.00	\$20.25	\$16.00	\$16.00	\$16.00	\$11.75		\$6.25	\$6.25
	10-trip	\$120.00	\$115.00	\$94.00	\$73.00	\$73.00	\$73.00	\$50.00		\$30.00	\$30.00
	20-trip	\$210.25	\$201.00	\$163.00	\$125.75	\$125.75	\$125.75	\$88.25		\$50.50	\$50.50
	Monthly	\$386.00	\$370.00	\$299.75	\$231.25	\$231.25	\$231.25	\$161.25		\$93.50	\$93.50
Santa Clara	One-way	\$15.50	\$14.50	\$11.75	\$10.25	\$10.25	\$10.25	\$6.25	\$4.75		\$4.75
	Round-trip	\$27.50	\$26.00	\$20.25	\$16.00	\$16.00	\$16.00	\$11.75	\$6.25		\$6.25
	10-trip	\$120.00	\$115.00	\$94.00	\$73.00	\$73.00	\$73.00	\$50.00	\$30.00		\$30.00
	20-trip	\$210.25	\$201.00	\$163.00	\$125.75	\$125.75	\$125.75	\$88.25	\$50.50		\$50.50
	Monthly	\$386.00	\$370.00	\$299.75	\$231.25	\$231.25	\$231.25	\$161.25	\$93.50		\$93.50
San Jose	One-way	\$15.50	\$14.50	\$11.75	\$10.25	\$10.25	\$10.25	\$6.25	\$4.75	\$4.75	
	Round-trip	\$27.50	\$26.00	\$20.25	\$16.00	\$16.00	\$16.00	\$11.75	\$6.25	\$6.25	
	10-trip	\$120.00	\$115.00	\$94.00	\$73.00	\$73.00	\$73.00	\$50.00	\$30.00	\$30.00	
	20-trip	\$210.25	\$201.00	\$163.00	\$125.75	\$125.75	\$125.75	\$88.25	\$50.50	\$50.50	
	Monthly	\$386.00	\$370.00	\$299.75	\$231.25	\$231.25	\$231.25	\$161.25	\$93.50	\$93.50	

Source: ACE (via <https://acerail.com/tickets/>).

Table 7-2: Existing ACE Fare Structure – Pricepoint Summary

Origin station	← Destination station →									
	SKT	LTM	TRA	VAS	LIV	PLS	FMT	GAC	SCC	SJC
SKT		B	D	F	F	F	H	J	J	J
LTM	B		C	E	E	E	G	I	I	I
TRA	D	C		C	C	C	E	G	G	G
VAS	F	E	C		A	A	C	E	E	E
LIV	F	E	C	A		A	C	E	E	E
PLS	F	E	C	A	A		C	E	E	E
FMT	H	G	E	C	C	C		C	C	C
GAC	J	I	G	E	E	E	C		A	A
SCC	J	I	G	E	E	E	C	A		A
SJC	J	I	G	E	E	E	C	A	A	

Fares by pricepoint					
	One-way	Round-trip	10-trip	20-trip	Monthly
A	\$4.75	\$6.25	\$30.00	\$50.50	\$93.50
B	\$5.25	\$6.50	\$26.25	\$52.25	\$97.50
C	\$6.25	\$11.75	\$50.00	\$88.25	\$161.25
D	\$6.50	\$12.25	\$52.00	\$93.25	\$168.75
E	\$10.25	\$16.00	\$73.00	\$125.75	\$231.25
F	\$10.75	\$16.75	\$75.00	\$131.50	\$241.75
G	\$11.75	\$20.25	\$94.00	\$163.00	\$299.75
H	\$12.25	\$22.00	\$98.00	\$170.50	\$312.75
I	\$14.50	\$26.00	\$115.00	\$201.00	\$370.00
J	\$15.50	\$27.50	\$120.00	\$210.25	\$386.00

Source: ACE (via <https://acerail.com/tickets/>).

7.1.1.2 Special Discount Programs

In addition to the fare savings offered for more frequent riders through the five basic fare buckets discussed above, ACE also offers a 50-percent discount for seniors, people with disabilities, Medicare recipients, and passengers who already have a reduced-fare identification card for connecting transit services. To qualify for this discount, the passenger must provide proof of eligibility:

- Seniors aged 65 and older must present a valid photo identification
- Passengers with a disability must present documentation of a qualified disability from the Department of Motor Vehicles (DMV)
- Medicare recipients must present their Medicare card
- Passengers who already have a reduced-fare identification card for connecting transit services, such as an Access San Joaquin Discount Fare Card (DFC) or a Regional Transit Connection (RTC) Discount Card, must present their reduced-fare identification card

Original proof of eligibility must be presented when purchasing tickets at the station. This discount is also available through the ACE Rail mTickets app, but the passenger must submit a paper application with a copy of the required proof of eligibility to enroll. Original proof of eligibility must also be presented to staff aboard trains upon request.

Children aged five and under can travel for free when accompanied by a paying adult, while tickets for children between six and 12 years old are available at a 50-percent discount.

Groups of 10 or more people also qualify for group travel, which includes station-to-door itinerary service and reserved seating for the group in a designated section of the train. For school groups, one chaperone rides free for every ten students.

7.1.1.3 Pilot Discount Programs

ACE also offers two pilot discount programs: the Student Incentive Program and the Community Assistance Program (CAP). The Student Incentive Program offers special student ticketing options for students enrolled at participating colleges (Santa Clara University, San José State University, and Las Positas College). Students at Santa Clara University and San José State University can purchase these discounted tickets directly from the

college institution but not through the ACE Rail mTickets app. Students enrolled at Las Positas College need to purchase tickets at the Livermore Amador Valley Transit Authority (LAVTA)/Wheels transfer center.

Passengers who need financial assistance can apply for CAP, which offers discounts of approximately 50 percent off of regular ACE fares. Applicants must be between 13 and 64 years of age, must not be eligible for other ACE discount ticket programs, and have a household income at or below 200 percent of Federal poverty levels. Applicants must contact 2-1-1 in San Joaquin County for income assessment verification and submit an entitlement request form to the ACE Ticketing Department for validation before being able to purchase CAP tickets through the ACE Rail mTickets app.

7.1.1.4 Fare and Ticketing Planning

SJRRC is currently in the beginning stages of a comprehensive evaluation of ACE fares and ticketing. This planning effort started with an assessment of the current fare structure. Currently, there is no well-defined methodology for setting ACE fares, and discounts by bucket (i.e., round-trip, 10-trip, 20-trip, monthly) are not consistent across the system. As part of this effort, SJRRC staff are also exploring the implementation of a rationalized fare structure modeled on the current *San Joaquins* fare structure (see **Section 7.1.2** for further discussion). This could include the normalization of discount percentages by bucket systemwide. SJRRC staff are also evaluating several potential options for revamping ACE fares generally.

The timing for implementing any fare structure changes is tied to SJRRC's pursuit of a new, fully-digitized ticketing platform for ACE, which is a key component of modernizing ACE's "in-station" ticket offerings and unifying passenger behavior across both app-based and paper ticketing. With this change, all passengers—regardless of whether they have an app-based or paper ticket—would be required to tap or scan their ticket at an electronic validator at the station prior to boarding. A Request for Information (RFI) for the new ticketing platform was released in May 2023, and a Request for Proposals (RFP) is expected to be released shortly. The target completion date for the new ticketing platform is sometime in 2026.

7.1.2 *San Joaquins*

7.1.2.1 Overview

As the operator of the service, Amtrak manages and operates ticketing for *San Joaquins* trains and connecting Thruway buses, but general fare policy is established by the SJJPA.⁽¹⁶⁾ The *San Joaquins* service operates on a reserved ticketing system, where tickets are valid only for a specific date and for a specific train or Thruway bus, and must be purchased prior to boarding.⁽¹⁷⁾ Like other Amtrak services, tickets can be purchased online through the Amtrak website (<http://www.amtrak.com>) or *San Joaquins* website (<https://amtraksanjoaquins.com/>), through the Amtrak mobile app, at automated ticket kiosks (at most stations), by phone, at ticket counters at staffed stations, or through travel agents. If seats are available, tickets may be purchased from the conductor after boarding the train, but a surcharge is applied if the boarding station is staffed. All *San Joaquins* tickets are for

(16) Ticket modification and cancellation are subject to Amtrak policies.

(17) In terms of operations, reserved ticketing allows for better control over seating capacity to prevent standing conditions, particularly during periods of high demand. When displaying potential itineraries during the booking process, Amtrak's reserved ticketing system also indicates the level of crowding (e.g., "90% full") to give passengers the option to choose trains or buses with more available capacity.

“coach” class, reflecting the current rolling stock design and amenities. Purchasing a ticket guarantees a seat on the train or Thruway bus, but not a specific seat.⁽¹⁸⁾

Fares are calculated according to a distance-based formula, with a descending fare-per-mile contribution as trip distance increases, and then rounded to the nearest \$0.25. Passengers purchasing a combined rail and Thruway bus ticket are assessed a fare equal to the sum of the individual rail and bus tickets. Transfer discounts are not explicitly offered for combined rail and Thruway bus tickets, as the formula’s cost-per-mile is lower for Thruway buses than for trains, providing an inherent discount for combined tickets. In the past, Thruway bus tickets were not sold individually and needed to be purchased as part of a rail trip. With the passage of SB 742 in 2019, however, some Thruway bus routes have become available for bus-only ticketing, whereby passengers are no longer required to have a connecting train ticket.

The *San Joaquins* employ a single-bucket fare structure, but with peak and shoulder pricing⁽¹⁹⁾, typically around holiday periods such as Memorial Day (last Monday in May), Independence Day (July 4), Labor Day (first Monday in September), Thanksgiving (last Thursday in November), Christmas Day (December 25), and New Year’s Eve (December 31). The basic fare, which is referred to as the “Value” fare, includes a cancellation fee and restrictions on itinerary changes, applies in most cases. However, some segments also offer a “Flex” fare—with full refundability for cancellation and no fees for itinerary changes—at a slightly higher pricepoint.

When SJJPA assumed management of the *San Joaquins* in 2015, the service employed revenue management more liberally, with Amtrak increasing fares based on multiple escalation price-points as available capacity decreased or if warranted by potential opportunities for increased revenue. SJJPA subsequently revised the fare policy for the *San Joaquins* to eliminate revenue management, citing equity impacts, poorer ridership performance (particularly among last-minute bookings), and other factors. As a result, *San Joaquins* fares are no longer escalated directly based on available capacity or time of booking. However, adoption of the peak and shoulder pricing schemes allows SJJPA to continue employing some elements of revenue management.

In addition to individual tickets, the *San Joaquins* offers three different multi-ride passes for frequent riders, valid for a single fixed pair of trip ends (rail stations or Thruway bus stops):

- **Monthly Pass.** The Monthly Pass offers unlimited rides within a given calendar month and provides a discount of up to 50 percent (assuming a usage rate of 20 days, or 40 one-way trips). The Monthly Pass is only available for rail-only trips, with the exception of combined rail and Thruway bus trips to/from San Francisco.
- **10-Ride Pass.** The 10-Ride Pass offers 10 one-way rides at a 30-percent discount. The 10-Ride Pass is valid for a 90-day period (beginning the day of the first ride) and available for all rail and Thruway bus services.
- **6TIX Student Pass.** The 6TIX Student Pass offers six one-way rides at a 30-percent discount. Users are required to have valid college or university identification on hand to present to the conductor. The 6TIX Student Pass is valid for 365 days (beginning the day of the first ride) and available for all rail and Thruway bus services.

(18) The ticket reservation system allows for a 5-percent overbooking policy to avoid cases where a given itinerary may appear as “sold out” even though the passenger would only be without a seat for a short segment of the trip.

(19) “Peak” pricing applies an additional 20-percent fee during the peak demand period; “shoulder” pricing applies an additional 10-percent fee during the “shoulder” periods leading up to or following after the peak demand period.

Passes are available for purchase online, through the Amtrak mobile app, at ticket counters and ticket kiosks at stations, or by phone. After purchasing a pass, passengers must make a ticket reservation prior to boarding to apply the pass for a given ride.

Amtrak also offers two additional passes—the USA Rail Pass and California Rail Pass—with larger geographical coverage. The USA Rail Pass is valid for 10 rides (segments) over a 30-day period (beginning with the first segment) on Amtrak services throughout the country (with some route exceptions and other restrictions). The California Rail Pass, which must be purchased at a staffed station, is valid for travel on any 7 days during a consecutive 21-day period, with eligible services consisting of the three State-operated corridors (*San Joaquins*, *Capitol Corridor*, and *Pacific Surfliner*) and most of their connecting Thruway buses (including service to Reno and Las Vegas), as well as the *Coast Starlight* between Los Angeles and Dunsmuir (Siskiyou County). For both passes, travel is restricted to two roundtrips (four one-way trips) on a given route segment.

7.1.2.2 Discount Programs

The *San Joaquins* offer several standardized and seasonal discounts to reduce the burden of ticket prices and promote ridership:

- **California Everyday Discounts.** Developed in coordination with the two other State-funded intercity services (*Capitol Corridor* and *Pacific Surfliner*), this program provides a 15-percent discount for the following passengers when entering a discount code during booking checkout:
 - Seniors (62 years of age or older)
 - Passengers with disabilities and their companions
 - Veterans and active military personnel, including their spouses and dependents
 - Students between the ages of 13 and 25

Children between 2 and 12 years of age receive a 50-percent discount.

- **Group discounts.** To increase competitiveness with other modes for passengers traveling in groups, the *San Joaquins* also offers several discounts specifically for group passengers:
 - **Groups.** Passengers traveling together in groups of 15 or more are eligible for a 30-percent discount off the normal fare.
 - **Kids ‘n’ Trains.** This seasonal program offers significantly reduced fares for school and youth groups (grades K–12 or ages 5 to 18) and their chaperones. The same low fare is offered for everyone in the group, both children and adults, for one-way or round-trip travel on the same day. For round-trip travel, the fare is doubled if the return leg is not on the same day. Currently, the program is structured around five zones as shown in **Figure 7-1**, with slightly different pricing for Zone 1 and for Zones 2–5. Travel on Thruway buses under this program is only permitted between Emeryville and San Francisco, between Stockton and Sacramento, and between Martinez and Six Flags Discovery Kingdom.
 - **Friends and Family.** This program offers discounts for small groups of up to 6 passengers. The promotion offers a 50-percent discount for each companion fare with the purchase of a full-fare adult ticket.

Beyond the discount programs described above, the *San Joaquins* also offer additional promotional overlays to further drive incremental ridership and revenue. Examples of regular promotions currently in effect (as of July 2023) or recently offered include the following:

- **Summer travel sale.** With the purchase of one ticket, this promotion offers a discount of 50 percent on up to 5 additional tickets.
- **Spring break sale.** This promotion offers a discount of 30 percent on tickets.
- **Senior midweek sale.** This promotion offers a 50-percent discount for seniors when traveling on Tuesdays, Wednesdays, or Thursdays.

The *San Joaquins* also occasionally operate special trains or offer mini-campaigns as a regular part of partnerships and strategies for incremental ridership and revenue. Special trains typically involve extending a regularly-scheduled train, adding a “special” (i.e., non-regularly-scheduled) station stop, or operating a special train, usually as a way to introduce new riders to the service at marginal additional operating cost and substantially reduced fares. Examples include the special stop at Allensworth (for Colonel Allensworth State Historic Park) and the Battle of the Bay (games between the Bay Area’s two Major League Baseball franchises, the San Francisco Giants and Oakland Athletics).

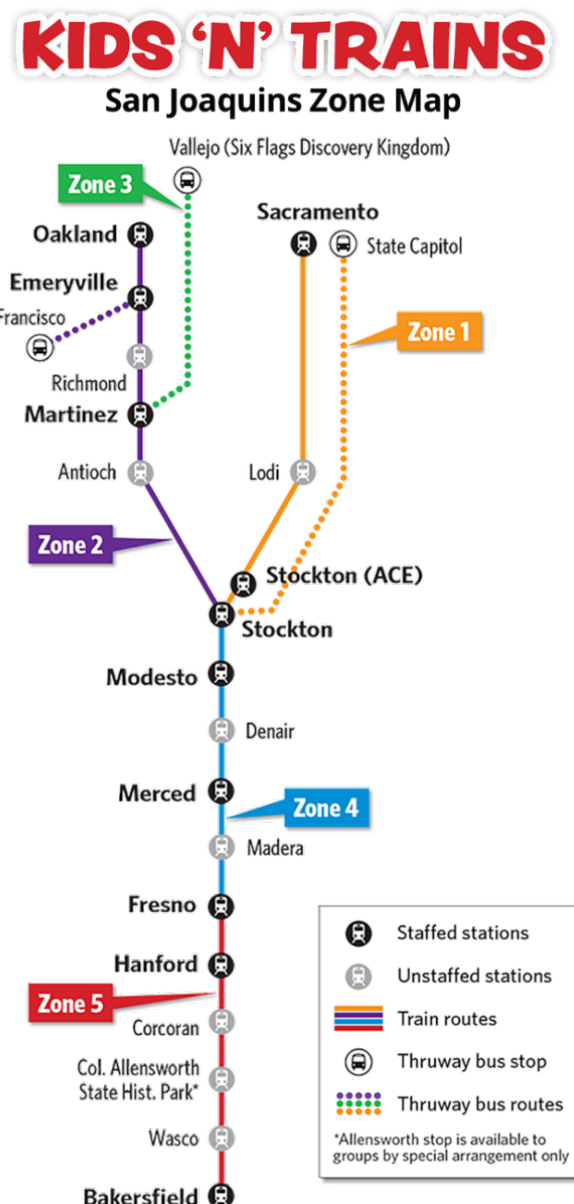
Mini-campaigns are typically designed to promote ridership in a specific area of the corridor, often in conjunction with an event, typically involving a discount for a certain stop for a day or other designated period of time. Examples include mini-campaigns for the Hanford Winter Wonderland ice rink and the California Hispanic Chambers of Commerce’s California Business Policy Summit.

As the service is currently operated by Amtrak, the *San Joaquins* are also eligible for membership points accrual and redemption through the Amtrak Guest Rewards program.

7.1.2.3 Fare Structure History and Future Goals

The current fare structure for the *San Joaquins* originates from SJJPA’s decision in 2018 to eliminate revenue management. At that time, fares for the *San Joaquins* were normalized along the fare-per-mile methodology described above (including a decreasing fare-per-mile calculation as trip length increases) to ensure a more equitable fare structure throughout the corridor. These changes were informed by guidance from Amtrak and the LOSSAN Rail Corridor Agency based on a similar normalization process undertaken for the *Pacific Surfliner*.

Figure 7-1: Kids ‘n’ Trains Zone Map



Source: SJJPA.

SJJPA staff are also currently exploring changes related to the fare structure:

- **Fare capping.** With a significant share of *San Joaquins* ridership coming from disadvantaged communities, fare capping would ease the financial burden of fares by allowing riders to “build” their way to a discounted multi-ride pass one ride at a time, as opposed to paying the full cost upfront. Implementation schemes could include capping fare payments at a given number of trips within a given time period or offering a graduated discount for each new trip based on the number of trips already taken. Examples of transit agencies in California that have recently implemented fare capping include the Los Angeles County Metropolitan Transportation Authority (LACMTA or “Metro”); San Diego Metropolitan Transit System (MTS) and North County Transit District (NTCD); the Alameda–Contra Costa Transit District (“AC Transit”); and SacRT.
- **Means-based fares.** As described above, the *San Joaquins* already offers several discount programs, but like many transit operators, these discounts are primarily intended for vulnerable or dependent age groups (e.g., seniors, children) and people with disabilities. With the increased industry-wide focus on equity more recently, many transit agencies have been implementing or exploring discounted fare structures based on income level. Examples of recent implementations of means-based fare programs in California include the Low Income Fare is Easy (“LIFE”) program being administered in the Los Angeles area by LACMTA and the Clipper START pilot program being administered in the San Francisco Bay Area by MTC.
- **Business class.** Amtrak already offers business class in the Northeast Corridor, the Midwest corridors, and select West Coast corridors (*Cascades* and *Pacific Surfliner*), but the *San Joaquins* currently only offers a single (“coach”) fare class. The SJJPA has included exploration of a new “business” class section in its latest annual business plans. At the bare minimum, implementation would require development of a methodology and fare grid for the new fare class, but could also include considerations related to rolling stock (e.g., seating configuration).⁽²⁰⁾
- **Single-use coupons.** SJJPA is currently exploring single-use coupons as an overlay to capture ridership from event intercepts and partner promotions.
- **Future fare increases.** Establishing a well-defined methodology for regular fare increases based on inflation, operating cost increases, and other factors will help ensure a stable fare revenue stream for the *San Joaquins*.

7.1.3 Existing Fares for Other Services in the North Valley Corridor

7.1.3.1 Overview

In addition to looking at existing fare structures and policies for ACE and the *San Joaquins*, it is also useful to consider existing fares for other public transit services within the North Valley corridor to inform future fare structure and policy planning for North Valley Rail. Fares can be a significant factor in people’s travel choices—not just when evaluating transit-based options against other modes (e.g., personal automobile), but also when weighing one or more transit-based options against each other.

While it is still too early to establish specific fares for North Valley Rail, the analysis of existing transit fares presented below can help inform that process, but will, of course, need to be updated to reflect current conditions

(20) While the Siemens Venture cars produced for the Illinois Department of Transportation (IDOT) for use in the Midwest include business class seating, the cars being produced for Caltrans under the same joint order only include coach seating.

at that time. While the analysis below focuses strictly on existing fares within the North Valley and between the North Valley and Sacramento, it can also be expanded in the future to a wider geographical area to allow additional focus on other markets beyond Sacramento (e.g., Bay Area, San Joaquin Valley).

As mentioned earlier, SJJPA staff have already completed an extensive fare normalization effort to establish a distance-based fare grid for the existing *San Joaquins* service that is equitable across the entire system. While the creation of a basic fare grid for the new North Valley stations would likely follow the same methodology, a comparison against other transit-based options can provide useful additional information for consideration, particularly in cases where ridership is underperforming (which may, for example, indicate that the service is not competitive against other options) or where capacity is available to accommodate incremental ridership. Promotional overlays, for example, can help increase market share (by introducing new riders to the service) and encourage all-new demand (i.e., trips that would not have been made at all) to support the service and capture additional fare revenue, without altering the equity of the basic fare grid.

7.1.3.2 Analysis and Comparison

Fares for the *Coast Starlight* are somewhat variable, likely reflecting adjustments for available capacity and travel date based on Amtrak's revenue management policy. For example, queries through Amtrak's online booking system for travel between Chico and Sacramento on several different dates showed at least four different pricepoints for a one-way adult fare in coach class: \$18.00, \$22.00, \$27.00, and \$35.00.

Typical (adult) fares for intercity buses within the North Valley are summarized in **Table 7-3**. Fares are the same for Greyhound and FlixBus, but day-of bookings are priced more expensive than advance bookings. When booking, a transaction fee (\$3.99) is also applied for each payment transaction, separate from the fares shown in **Table 7-3**.

Table 7-3: Intercity Bus Fares (Greyhound and FlixBus)

Origin stop and booking date ↓ ↓ ↓ ↓ ↓		Fares (one-way, adult)			
		← Destination stop →			
		Chico	Oroville	Marysville	Sacramento
Chico	Day-of:		\$9.99	\$20.99	\$33.99
	Advance:		\$8.99	\$18.99	\$26.99
Oroville	Day-of:	\$9.99		\$15.99	\$38.99
	Advance:	\$8.99		\$13.99	\$35.99
Marysville	Day-of:	\$20.99	\$15.99		\$19.99
	Advance:	\$18.99	\$13.99		\$17.99
Sacramento	Day-of:	\$33.99	\$38.99	\$19.99	
	Advance:	\$26.99	\$35.99	\$17.99	

Source: AECOM.

As shown in **Table 7-3**, day-of bookings are slightly more expensive than advance bookings, with the difference ranging anywhere from as little as \$1.00 for shorter-distance trips (e.g., Chico ↔ Oroville) and \$7.00 for longer-distance trips (e.g., Chico ↔ Sacramento). Also of note is the lower fare for Chico ↔ Sacramento trips than for Oroville ↔ Sacramento trips, which may have to do with competition with the *Coast Starlight*.

Fares for the Yuba–Sutter Transit commuter bus service are shown in **Table 7-4**.

As might be expected, the commuter bus generally offers the cheapest fares within the corridor relative to distance, although travel is only possible between the Yuba–Sutter area and Sacramento. For travel between Butte County and the Yuba–Sutter area or Sacramento, the *Coast Starlight* or intercity bus may be cheaper,

depending on the desired itinerary and time of booking. Between Chico and Sacramento, for example, the *Coast Starlight* generally appears to be cheaper than intercity bus, except in cases when the fare has been escalated to the highest buckets. In these situations, typically for bookings under short notice, intercity bus can be cheaper. As the *Coast Starlight* does not stop at intermediate stations between Chico and Sacramento, transit users likely default to intercity bus for trips between Butte County and the Yuba–Sutter area.

Table 7-4: Commuter Bus Fares (Yuba–Sutter Transit)

Fare category or product		Morning/ afternoon	Midday
One-way fare: Basic fare		\$4.50	\$4.50
One-way fare: Senior (age 65+) or passenger with disabilities		\$4.50	\$2.25
One-way fare: Youth (age 5–18)		\$4.50	\$2.25
One-way fare: Children (age 4 and under with adult)	(a)	Free	Free
Monthly pass: Yuba–Sutter Transit only	(b)	\$135.00	
Monthly pass: Yuba–Sutter Transit and SacRT	(b)	\$185.00	

Source: Yuba–Sutter Transit (via https://www.yubasuttertransit.com/files/fa794cf01/YST_Sacramento_09-01-20+v3.pdf).

Notes:

- (a) Limit of two free fares per adult.
- (b) Monthly passes are valid on both morning/afternoon and midday Sacramento service, as well as any local or rural fixed-route service operated by Yuba–Sutter Transit.

7.1.3.3 Thruway Route 3

In addition to the above three options, Thruway Bus Route 3 also operates through the North Valley corridor, providing timed connections at Stockton San Joaquin Street station with Oakland-branch *San Joaquins* trains for continuing journeys south of Stockton. Because Route 3 is not currently eligible for bus-only travel as allowed under SB 742, passengers must currently purchase a connecting train ticket in order to use Route 3 for travel within the North Valley corridor. As combined rail and bus fares on the *San Joaquins* service are the sum of the individual rail and bus portions of the trip, the bus-only fare associated with the North Valley portion can be derived by comparing the full combined (rail and bus) fare against the fare for the rail-only portion of the trip. This analysis is shown in **Table 7-5** using sample itineraries from Stockton San Joaquin Street to the North Valley.

Table 7-5: Thruway Route 3 Fares

Combined rail and bus trip <i>Stockton San Joaquin Street to or from:</i>	Actual fare (one-way, adult)	Rail-only trip <i>Stockton San Joaquin Street to or from:</i>	Actual fare (one-way, adult)	Thruway-only trip <i>Sacramento to or from:</i>	Estimated fare (one-way, adult)
Chico	\$22.00	Sacramento	\$11.00	Chico	\$11.00
Oroville	\$19.50			Oroville	\$8.50
Marysville	\$16.00			Marysville	\$5.00

Source: AECOM.

As shown in **Table 7-5**, the estimated Thruway-only fare is priced substantially lower than either the *Coast Starlight* or intercity bus. For example, the estimated Thruway fare from Chico to Sacramento is \$11.00, which compares very favorably against the *Coast Starlight* (\$18.00–\$35.00) and intercity bus (\$26.99 for advance booking or \$33.99 for day-of booking). In the short-distance market between Marysville and Sacramento, the estimated Thruway-only fare is at the same approximate pricepoint as the basic fare for commuter bus.

7.2 Fare Strategy Considerations

The following considerations should be carefully weighed when it comes time to establish fares for North Valley Rail. As fares will likely not be set until much closer to the start of service, fare structure and policy for the North Valley Rail should be re-evaluated at that time, starting with the issues identified here and adapting as needed.

7.2.1 Valley Rail Program and Fare Rationalization

SJJPA has identified several future goals and considerations related to future fare structure and policy for the *San Joaquins* as described earlier, including fare capping, means-based fares, business class, single-use coupons, and a methodology for future fare increases. The larger Valley Rail expansion program has been a key driver for the consideration of future adjustments to the current fare structure and policy, including the exploration of uniform fare pricing for ACE and the *San Joaquins* for shared station pairs.⁽²¹⁾ Additionally, SJRRC's current effort to review ACE's fare structure will take into consideration the emerging fare structure of the *San Joaquins*.

Both SJRRC and SJJPA are also exploring the possibility for implementing a “uniform fare grid” across both the ACE and *San Joaquins* systems, such that the fare for a given station pair would be the same price, regardless of whether the trip is taken via ACE or the *San Joaquins*. From a passenger perspective, a uniform fare regardless of operator may simplify trip planning, but some logistical considerations would likely need to be addressed prior to any practical implementation. In particular, the two systems currently handle ticketing quite differently (as described earlier), with ACE operating on a “first come, first served” basis with unreserved ticketing (like most commuter rail systems) and the *San Joaquins* employing reserved ticketing (like typical intercity rail systems). Fundamental differences between the two services (e.g., rolling stock, passenger amenities, service frequency, etc.) may also warrant different pricing structures.

A similar overlap of intercity and commuter rail services operating within the same rail corridor can be found in Southern California between the *Pacific Surfliner*, Metrolink's Ventura County and Orange County Lines, and NCTD's COASTER service, which can provide a useful precedent for consideration. The current solution there revolves around two elements: honoring monthly passes from other operators for the overlapping trip portions and operating some trips as “codeshare” services. Specifically, the Rail 2 Rail program allows passengers with a Metrolink Monthly Pass or NCTD COASTER Regional Monthly Pass to use *Pacific Surfliner* trains for travel within the station pairs indicated on their pass at no additional charge, although there are blackout dates (usually for holidays or major events such as San Diego Comic Con or opening weekend at Del Mar Racetrack) to account for increased ridership on Amtrak trains.

Similarly, passengers with a *Pacific Surfliner* Monthly Pass can board Metrolink or COASTER trains for travel within the station pairs indicated on their pass at no additional charge. *Pacific Surfliner* 10-Ride Passes are also accepted on Metrolink trains on the Ventura County Line between Burbank Airport (South) Station and Los Angeles Union Station, but not on other segments overlapping with Metrolink.

For travel outside the station pairs indicated on a given Monthly Pass, the passenger is required to purchase a ticket with the corresponding operator for the portion of the trip not covered by the pass. For Metrolink or NCTD pass holders with bicycles, a paid *Pacific Surfliner* ticket with a bike reservation is required.

(21) Shared station pairs would be present where ACE and the *San Joaquins* operate along the same route, such as for the Sacramento Extension (UP Sacramento Subdivision between Natomas and Stockton) and for North Valley Rail.

Separate from the Rail 2 Rail program, there are also four *Pacific Surfliner* trains (two roundtrips daily) that are considered “codeshare” services with Metrolink’s Ventura County Line. All Metrolink pass and ticket holders may use these trains within the station pairs indicated on their ticket or pass, without restrictions on blackout dates.

SJRRC staff are also considering implementation of *uniform base fares calculated by distance* for both services, meaning that two different trips (i.e., different station pairs), each of the same distance but one on the ACE system and one on the *San Joaquins* system, would be priced the same. Although SJRRC’s new ticketing platform (discussed earlier in **Section 7.1.1.4**) will be focused on ACE, the associated RFP is anticipated to require that the platform be able to handle the *San Joaquins* service, including Thruway connections. Integration of the *San Joaquins* service into the ticketing platform would likely be implemented incrementally after the platform’s initial debut in 2026. While Amtrak may still be permitted to sell tickets in the future, a single, SJRRC-controlled ticketing platform has the potential to greatly simplify ticketing for passengers.

Overall, there are positives and negatives associated with more comprehensive approaches to fare rationalization across both services and more limited approaches that are only valid for certain cases (e.g., specific station pairs, specific ticket types, etc.). However, these issues are not unique to North Valley Rail and should be explored in depth as part of the larger Valley Rail program. Based on current timelines for future service expansion, ACE and *San Joaquins* trains would already be operating in shared corridors once the Sacramento (Natomas) Extension opens. Solutions for North Valley Rail would likely align with the overarching approach determined in the earlier extension to Natomas to ensure consistency across the entire expanded Valley Rail system.

7.2.2 Other Key Drivers

Outside of the changes described above, there are also other key future drivers influencing the overall context of fare structure and policy for ACE and the *San Joaquins*. The first involves HSR, which will replace the *San Joaquins* south of Merced. With both ACE and the *San Joaquins* providing timed connections with HSR in Merced, extensive changes to the fare structure and policy may be needed to ensure equitable and consistent treatment of the two connecting services and of the entire integrated system (HSR, conventional rail, and Thruway bus) as a whole.

In terms of ticketing and fare policy for the HSR service, revenue management is being considered, meaning that the future SJRRC ticketing platform will also need expandability to incorporate such elements. Revenue management could be compartmentalized, however, such that it only applies to longer-distance trips, with shorter-distance trips being less affected and still priced according to simpler, more passenger-friendly schemes.

The second key driver is the California Integrated Travel Project (“Cal-ITP”), which involves modernizing and standardizing transit riders’ experience throughout the state by focusing on three fundamental areas of improvement:

- **Contactless payment.** Enabling fare payment via contactless bank cards, in lieu of only cash or agency-specific fare cards. Though contactless payments are an option for “walk-up” unreserved systems like local transit and commuter rail services, contactless payments do not provide the advance purchase or reservation requirements for reserved services like the *San Joaquins*.
- **Automated fare discounts.** Automating the application process for discounted fares (e.g., seniors, youth, people with disabilities, lower-income riders, veterans, and others) and allowing for electronic verification of discount eligibility, eliminating the need for slow and time-intensive paperwork with each transit agency.
- **Trip planning.** Establishing minimum General Transit Feed Specification (GTFS) guidelines for all transit agencies across the state and assisting individual agencies with implementation.

While Cal-ITP is statewide in scope, some of the efforts are perhaps more relevant for local and regional transit than for intercity and inter-regional rail, which has historically operated quite differently from those systems. If these changes are in alignment with SJRRC's and SJJPA's overall approach to future fare collection and fare policy for ACE and the *San Joaquins*, however, then more specific consideration of Cal-ITP initiatives may be warranted in the context of North Valley Rail.

As with the other key drivers described above, however, it is expected that many of these issues will be addressed, if necessary, at the systemwide level by SJRRC and SJJPA prior to North Valley Rail. As an incremental expansion of the larger system, North Valley Rail would adopt whatever fare structures and policies are in effect at that time for the respective services.

7.2.3 Specific Considerations for North Valley Rail

While it is expected that much of the fare structure and pricing for North Valley Rail would derive directly from the corresponding systemwide elements, there are also potential considerations more specific to North Valley Rail, which are briefly discussed below.

7.2.3.1 Student Discounts

As described earlier, the *San Joaquins* currently offers the 6TIX Student Pass, while ACE has a pilot Student Incentive Program for students at participating colleges. College students are expected to be a key ridership driver for North Valley Rail, including for commutes to/from campus and for trips back home (to other parts of the state) or leisure trips over long weekends or academic breaks. These discount programs should therefore be considered for expansion under North Valley Rail to include Chico State and Butte College. The programs should also be considered for expansion to include California State University, Sacramento ("Sacramento State") and University of California, Davis ("UC Davis") if those institutions have not already been added as part of earlier Valley Rail service expansions prior to North Valley Rail.

7.2.3.2 Service Duplication in the Yuba–Sutter Area

As discussed earlier, Yuba–Sutter Transit currently operates a weekday bus service between the Yuba–Sutter area and Downtown Sacramento, primarily during the commute periods but also including some limited midday service. As shown in the analysis presented in **Table 7-6**, fare pricing based on existing *San Joaquins* fares would result in one-way fares for North Valley Rail on the order of approximately \$10.00 or more for these trips, or almost twice (or more) of the comparable Yuba–Sutter Transit fare.

Fare pricing for the new stations at Marysville–Yuba City and Plumas Lake should therefore carefully consider potential competition and duplication in the Sacramento market. While North Valley Rail and Yuba–Sutter Transit each have distinct markets (intercity-focused vs. commute-focused, Capitol Mall area vs. Midtown Sacramento), there is some potential for overlap between the two, particularly in the commute market. These issues should be explored in more depth in subsequent stages of the project, in close coordination with Yuba–Sutter Transit. This should include a more detailed evaluation of future plans for their Sacramento bus service after North Valley Rail begins operation, and what, if necessary, is needed to differentiate the two services to avoid direct competition, both in terms of fares and in other areas.

7.2.3.3 Special Promotions

Two major venues—the Toyota Amphitheatre and the Hard Rock Hotel and Casino Sacramento—are located in Wheatland near the future Plumas Lake Station. Demand from these venues could be a significant source of incremental ridership and revenue for North Valley Rail, and fare promotions should consider ways to capture this market and introduce new passengers to the service. If warranted by demand, this could include special-

event trains with special fare pricing, as well as promotional offers through the venues (e.g., discounted event or venue tickets).

In the past, ACE has operated special event trains for San Francisco 49ers home games at Levi’s Stadium and is currently exploring future special service to concerts and other events at the stadium. As mentioned earlier, the *San Joaquins* also already offers fare promotions for Juneteenth service at Allensworth and for Battle of the Bay games at the Oakland Coliseum. These precedents show strong potential that can be carried directly over to North Valley Rail.

7.2.3.4 Discounts for Local Transit Connections

ACE passengers can transfer for free when making local connections via Santa Clara Valley Transportation Authority (VTA) buses and light rail vehicles or LAVTA buses. For North Valley Rail, similar agreements should be explored with Yuba–Sutter Transit and with B-Line, as these local transit operators would provide important first- and last-mile connections for train riders. Connections for Yuba City and for Chico State University are particularly important and should be prioritized if more open-ended (e.g., systemwide) agreements for fare-free transfers cannot be reached with the individual transit agencies. Similar agreements should also be explored with SacRT for connections within the Sacramento area if such agreements are not already in place as part of earlier Valley Rail service expansions prior to North Valley Rail.

7.3 Sample Fares

As an initial planning-level exercise, it is also informative to consider what actual fares for North Valley Rail might look like based on existing fare pricing for the *San Joaquins*. The *San Joaquins* were selected for this exercise because they most closely resemble the proposed North Valley Rail service (i.e., an intercity service) and because SJRRC’s and SJJPA’s approach to fare planning for the larger Valley Rail Program is currently guided by the existing *San Joaquins* fare structure as a foundation. While this is only a very simple analysis at this stage based on comparable station pairs, the results are meaningful in considering potential pricing schemes for the service. As these sample fares are based on existing fares (and represent costs in existing dollars), the actual fares for the service would likely be higher to reflect cost escalation to future-year dollars.

As discussed earlier, fare pricing for the *San Joaquins* is based on a fare-per-mile calculation. A sample fare grid for the North Valley Rail stations reflecting distance-based pricing can therefore be developed by referencing the existing fare grid for the *San Joaquins*. For this exercise, sample fares for each North Valley Rail station pair are referenced from comparable rail-only station pairs in the existing *San Joaquins* system based on travel distance. The results of this analysis are shown in **Table 7-6** for the four new North Valley Rail stations, Natomas (the Valley Rail terminus), and Midtown Sacramento (the main stop for North Valley Rail trains in Downtown Sacramento).

It should be noted that these fares are approximate only, as they are based on fares from comparable station pairs (as opposed to the actual fare-per-mile calculation), but the results should still give a good idea of the approximate pricing for North Valley Rail based on existing *San Joaquins* pricing.

As shown in **Table 7-6**, fare pricing based on existing pricing for the *San Joaquins* would result in very competitive fares against other intercity transit options in the North Valley. A trip from Chico to (Midtown) Sacramento, for example, would cost approximately \$18.00, compared to \$18.00–\$35.00 for the *Coast Starlight* and \$33.99 (day-of booking) or \$26.99 (advance booking) for Greyhound/FlixBus. Not surprisingly, fares would be less competitive against commuter buses in the shorter-distance markets (Yuba–Sutter area), with a trip from Marysville–Yuba City costing approximately \$9.75, compared to \$4.50 for Yuba–Sutter Transit.

Table 7-6: Sample Fare Grid

Origin station ↓ ↓ ↓	Fares (one-way, adult)						
	← Destination station and approximate distance (miles) from Midtown Sacramento →						
	Chico	Gridley	Oroville	Marysville– Yuba City	Plumas Lake	Natomas	Midtown Sacramento
	84	58	66	41	32	8	0
Chico		\$7.50		\$10.50	\$12.25	\$16.50	\$18.00
Gridley	\$7.50			\$7.50	\$7.75	\$11.00	\$12.50
Oroville				\$7.50	\$8.00	\$12.50	\$14.00
Marysville–Yuba City	\$10.50	\$7.50	\$7.50		\$5.00	\$8.00	\$9.75
Plumas Lake	\$12.25	\$7.75	\$8.00	\$5.00		\$7.75	\$8.00
Natomas	\$16.50	\$11.00	\$12.50	\$8.00	\$7.75		
Midtown Sacramento	\$18.00	\$12.50	\$14.00	\$9.75	\$8.00		

Source: AECOM.

7.3.1 Sample Fares for Longer-Distance Trips

For longer-distance trips beyond Midtown Sacramento, the fare-setting process would likely need to include more comprehensive consideration and coordination on fares for the HSR EOS and for other portions of the larger Valley Rail network (e.g., Union City extension). Based on initial discussions between SJJPA and the HSR Early Train Operator (ETO), base fares for the EOS are expected to be similar to the existing *San Joaquins* service, although premium fare products may also be offered to target more amenity-driven demand (e.g., business-class passengers). Some sample longer-distance fares to/from Chico based on the existing *San Joaquins* fare structure are provided below for illustrative purposes:

- Chico–Union City: \$32.25 ⁽²²⁾
- Chico–Oakland: \$34.50
- Chico–Fresno: \$41.00
- Chico–Bakersfield: \$53.50
- Chico–Los Angeles: \$67.50

7.4 Farebox Recovery and Funding Operations

Farebox revenue partially offsets the cost of providing transit service and is an important source of funds in the overall O&M budget. As with most public transit services in the United States, however, farebox revenue for North Valley Rail is not expected to be sufficient to cover the entire cost of providing the service. Farebox recovery, calculated as the ratio of farebox revenue to operating expenses (i.e., O&M costs), is a useful metric in evaluating the “self-sufficiency” of a transit service. A system with a high farebox recovery is able to cover a significant portion of its operating expenses through fares.

Based on data from the FTA’s National Transit Database (NTD) Agency Profiles (for ACE) and the latest (2023) SJJPA Business Plan for the San Joaquins, farebox recovery for both services has historically been in the same

(22) The total cost to travel to/from San Jose or the Peninsula would be slightly higher than the fare to/from Union City to account for the additional fare on connecting transit services (e.g., BART, Dumbarton Corridor buses).

general range (i.e., 40–55 percent). Post-COVID, farebox recovery for both services bottomed in 2021 and is currently on an upward trajectory, although it is still lower than pre-COVID levels.

While there are typically other minor sources of revenue outside of farebox revenue (e.g., parking revenue, advertising revenue), the *San Joaquins* and ACE generally rely on other funding sources to cover the remainder of their operating expenses:

- For the *San Joaquins*, SJJPA submits an annual funding request to the State to cover operating expenses, as well as other costs associated with administering and marketing the service. The State is the sole source of this funding, reflecting the function of the *San Joaquins* as an intercity service benefitting the entire state.
- For ACE, the remainder of operating expenses are typically covered by a range of local, State, and Federal sources, with the majority coming from local sales taxes generated through the LTF, State Transit Assistance (STA), and local ballot measures such as San Joaquin County’s Measure K, Alameda County’s Measure B and Measure BB, and Santa Clara County’s Measure A.

In the case of North Valley Rail, three of the daily roundtrips would be classified as “intercity” services and the remaining daily roundtrip would be classified as a “commuter” service, as shown in **Figure 3-7**.⁽²³⁾ Like the *San Joaquins*, it is expected that operating expenses for the three “intercity” roundtrips would be covered by a combination of directly-generated revenues (e.g., fares, parking fees, tenant leases, etc.) and State funding. Like ACE, operating expenses for the “commuter” roundtrip would be covered by a combination of directly-generated revenues and other sources of funding, potentially including local sales taxes and other local, State, and Federal sources.

Based on the forecasted ridership, annual fare revenues for the combined ACE and *San Joaquins* system are expected to increase by approximately \$7.1 million (2023 dollars) as a result of the Project. As summarized in **Section 3.8**, the Project is expected to increase annual O&M costs for the combined system by \$24.0 million (2023 dollars). The difference between the annual fare revenues and annual O&M costs would need to be covered by other sources of funding and revenue.

(23) On weekends and holidays, the “commuter” roundtrip would be operated as an “intercity” service.

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Chapter 8

Conclusion and Next Steps

This chapter summarizes the key outcomes and findings of the Strategic Plan Effort and the critical next steps for implementation of the project.

- 8.1 Conclusion
- 8.2 Next Steps

8.1 Conclusion

Supported by a comprehensive community and stakeholder engagement process, the Strategic Plan has advanced the initial planning and development for North Valley Rail, in support of the goal of bringing high-quality rail service to the North Valley, an underserved part of the state. While the Strategic Plan has been focused on the immediate goal of starting an initial service as soon as possible, the service would continue to grow over time (with the Draft 2023 CSRP targeting hourly frequency by 2050) and could be extended further north to Red Bluff and Redding.

Through this Strategic Plan, BCAG and its consultants—working closely with partner agencies SJRRC and SJJPA—have developed an initial project definition at a sufficient level of detail to be carried forward into the next phase of project implementation. This includes identifying the general service characteristics and other parameters of the project, potential infrastructure improvements and associated capital costs, and key benefits (ridership). The Strategic Plan has also helped to initiate and further discussions with the host railroad (UP) on the necessary infrastructure improvements and the potential use of CAFs; develop an overall funding and implementation strategy, particularly for the immediate next phase of project development (PA&ED); and explore potential fare strategies for the new service.

A summary of the project definition and key findings from the Strategic Plan is provided in **Table 8-1**.

A well-developed funding strategy for using regional and State funding sources has been identified for the next project phase (\$11.6 million), involving CEQA/NEPA environmental clearance (PA&ED) and 30% preliminary engineering (PE). Funding for the subsequent project phases, including detailed design (PS&E), permitting and ROW acquisition, and construction could come from a variety of Federal, State, and local/regional sources. Other issues affecting overall project implementation have also been identified, including potential changes to the SJRRC/SJJPA governance and operations models, coordination with the State on fleet procurement for the larger Valley Rail Program, and key permits and approvals.

Table 8-1: Summary of Initial Project Definition and Key Findings

Parameter	Description
Route	<ul style="list-style-type: none"> UP Sacramento Subdivision: Natomas–Marysville (Binney Junction) UP Valley Subdivision: Marysville (Binney Junction)–Chico
Stations	<ul style="list-style-type: none"> Plumas Lake Marysville–Yuba City (2 site options, including one with 3 design variants) Gridley Chico (2 site options)
Initial (“starter”) service	<p>4 roundtrips/day (including 3 roundtrips/day with timed connections to/from HSR in Merced, marked with an * below)</p> <ul style="list-style-type: none"> 1 roundtrip/day* Chico–Merced via ACE (UP Fresno Subdivision south of Stockton) 1 roundtrip/day* Chico–Merced via <i>San Joaquins</i> (BNSF Stockton Subdivision south of Stockton) 1 roundtrip/day* Chico–Stockton San Joaquin Street, with timed connections to/from Merced and Oakland branches of the <i>San Joaquins</i> 1 roundtrip/day Chico–Union City
Support facilities	<ul style="list-style-type: none"> 1 layover facility in Chico (2 site options) New side platform at Natomas
Key bus connections	<ul style="list-style-type: none"> Oroville (via Gridley) Sacramento International Airport (via Natomas) Supplemental corridor service (6 roundtrips/day) to connect with Valley Rail trains starting or terminating at Natomas
Preliminary estimated capital cost (YOE dollars)	<ul style="list-style-type: none"> Stations and layover facility: \$270.0 – \$285.0 million Corridor improvements: \$230.0 – \$245.0 million (may be replaced partly or in whole by capital access fees) Rolling stock would be part of the Valley Rail Program and is not included in the costs above
Estimated O&M cost (2023 dollars)	\$24.0 million annually (increase in systemwide cost due to Project)
Forecasted ridership (initial years of service)	476,200 (annual) or 1,305 (daily) (increase in systemwide ridership due to project)
Platform design length (typical)	705 feet (based on Bombardier BiLevel trainset with 8 passenger coaches)

Source: AECOM.

8.2 Next Steps

To maintain project momentum, the focus of project implementation should shift towards the next project phase and securing the necessary \$11.6 million in funding to support PA&ED/PE. In preparation for the environmental clearance process and preliminary engineering, BCAG, SJRRC, and SJJPA, in coordination with the State, will begin more in-depth discussions with UP on defining infrastructure improvements and identifying potential opportunities for the use of CAFs.

BCAG, SJRRC, and SJJPA will also continue to coordinate with the State and other project partners to ensure that North Valley Rail is included in the appropriate planning documents, including the Final CSRP and MPO-specific RTPs. This, together with the completion of the CEQA/NEPA environmental review process, ensures that critical Federal, State, and local/regional funding sources will be available to support subsequent project phases.

Caltrans, in coordination with BCAG, SJRRC, and SJJPA, will be conducting a related analysis of how to bring Valley Rail and North Valley Rail trains directly into Sacramento Valley Station and what infrastructure improvements might be required to achieve that longer-term goal.





NORTH VALLEY RAIL

**CHICO • GRIDLEY • MARYSVILLE/YUBA CITY
PLUMAS LAKE • SACRAMENTO**



North Valley Passenger Rail Strategic Plan

CHICO • GRIDLEY • MARYSVILLE/YUBA CITY
PLUMAS LAKE • SACRAMENTO

Appendix A Questionnaire Results Summary

Final Report

May 2024

NORTH VALLEY RAIL

CHICO • GRIDLEY • MARYSVILLE/YUBA CITY
PLUMAS LAKE • SACRAMENTO



NORTH VALLEY PASSENGER RAIL

Questionnaire Results Summary

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INTRODUCTION

From April 1, 2023–May 15, 2023, the North Valley Passenger Rail Corridor Project Team released a questionnaire online to collect initial feedback on how community members anticipate using the proposed North Valley Passenger Rail, possible opportunities and challenges regarding the alignment and stations, as well as connections to the stations. At the end of the campaign, the questionnaire received 506 responses, with a 95% completion rate. The average user spent 2 minutes completing the questionnaire.

The data provided by the summary will assist in providing data for the overall strategic plan currently being developed by the Butte County Association of Governments (BCAG).

PROJECT OVERVIEW



Currently, the North Valley region is only served by the once-daily Coast Starlight train between Seattle and Los Angeles. Without a dedicated passenger service, the region relies primarily on Thruway buses for transit connections to the rest of California. North Valley Rail will extend Altamont Corridor Express and Amtrak San Joaquin's trains north of Sacramento to integrate the region into the statewide rail network, including the future high-speed rail system.

Over the next several years, the more extensive Valley Rail program will bring Altamont Corridor Express (ACE) and San Joaquin trains along a new route north of Stockton via Midtown Sacramento and Natomas. North Valley Rail will build off these improvements to extend service north of Natomas. BCAG is closely coordinating with the San Joaquin Regional Rail Commission (SJRR) and the San Joaquin Joint Powers Authority (SJJPA), the managing agencies for both train services.



QUESTIONNAIRE PURPOSE & FORMAT

The questionnaire consisted of 10 questions with a combination of multiple-choice and open-ended questions. The questionnaire was hosted on the BCAG North Valley Passenger Rail project website (<http://www.bcag.org>).

The questions are as follows:

1

Where do you live?

2

Have you ridden passenger trains before?

3

What kind of trips do you anticipate taking on the North Valley Passenger Rail?

4

Where do you anticipate traveling to when using the North Valley Passenger Rail?

5

How do you plan to travel to the stations?

6

If buses were aligned with train arrivals/departures, would you consider taking transit to the station? If no, why not?

7

What would prevent you from using North Valley service?

8

What would you like to see included at the stations?

9

How often would you use North Valley Rail Service?

10

Please share with us any additional comments you have about this proposed passenger rail service.

QUESTIONNAIRE RESULTS

1

QUESTION 1: Where do you live?

HIGHLIGHTS: Chico was the most prominent, with 326 responses. Following was Paradise with 52, Oroville with 34, Somewhere else in Butte County with 13, Marysville/ Yuba City with 12, and Gridley with 11. Others include Sacramento, Palermo, Durham, Single Springs, Magalia, Berry Creek, Sacramento, Feather Falls, Redding, and Ukiah.

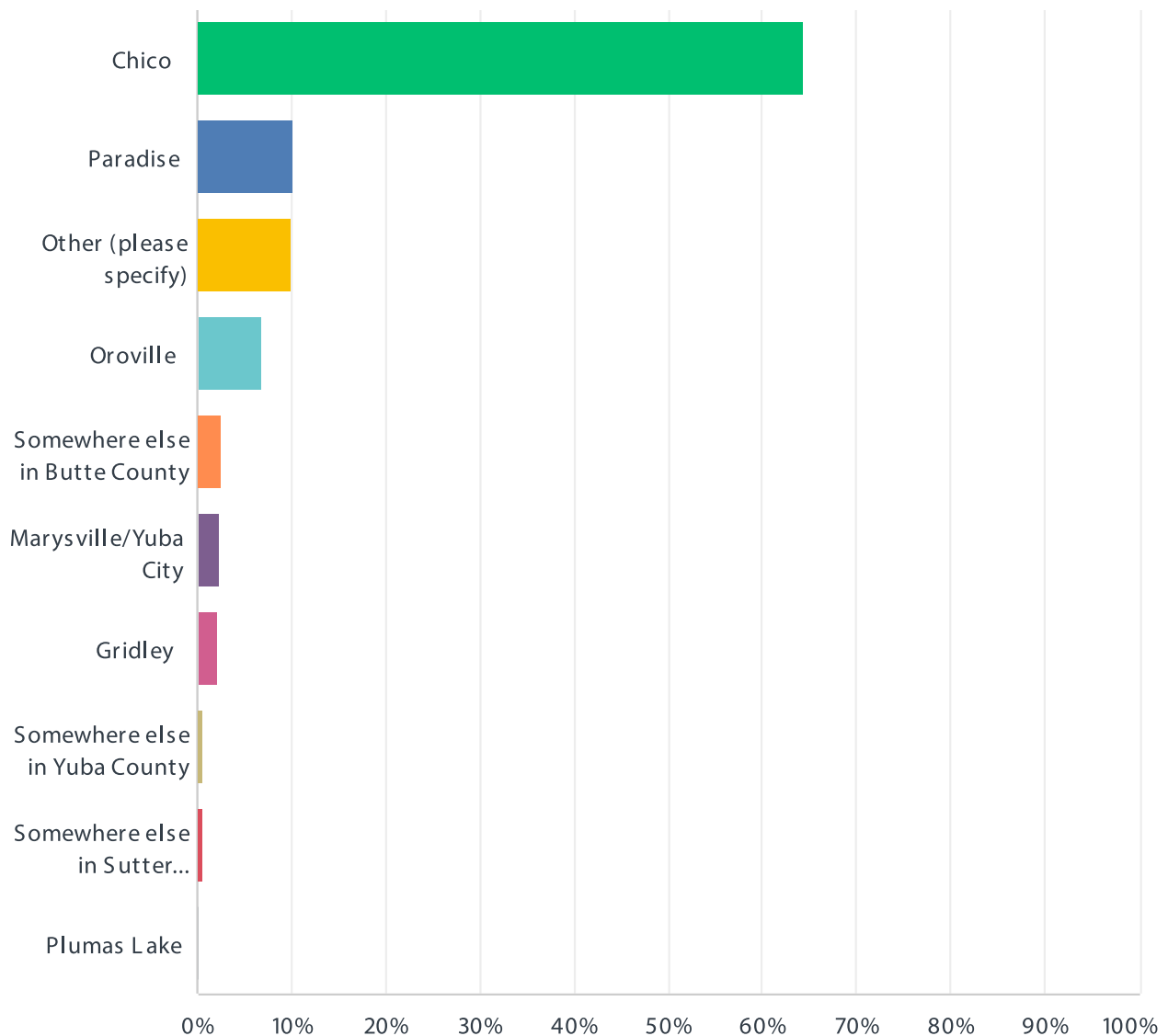


Figure 1: Question 1 Graph Results

2

QUESTION 2: Have you ridden passenger trains before?

HIGHLIGHTS: Of 506 responses, 425 said they've ridden a passenger train, while 78 said they have not.

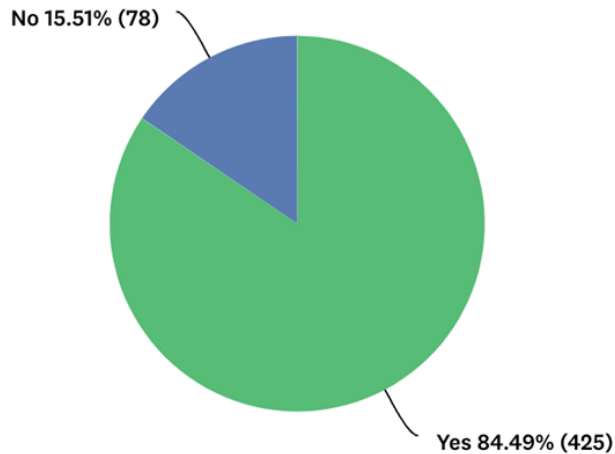


Figure 2: Question 2 Graph Results

3

QUESTION 3: What kind of trips do you anticipate taking on the North Valley Passenger Rail?

HIGHLIGHTS: Recreation/leisure was the dominant response, with 424 answers. Non-commute businesses travel with 163, Medical at 123, Commute at 91, School at 27, and Other at 83. Others anticipated trips included visiting family, airports, and SMF access.

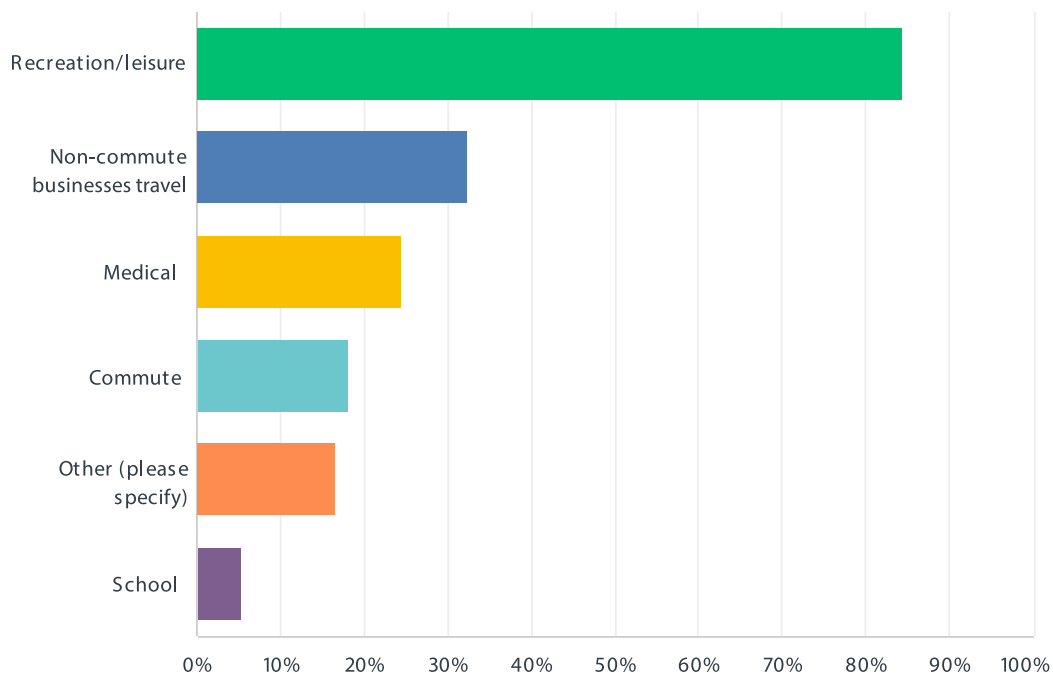


Figure 3: Question 3 Graph Results

4

QUESTION 4: Where do you anticipate traveling to when using the North Valley Passenger Rail?

HIGHLIGHTS: Sacramento was the dominant response, with 433 responses. Then the Bay Area with 350 responses, Southern CA with 214 responses, Butte, Yuba, and Sutter Counties with 201 responses, and San Joaquin Valley with 75 responses. Other responses included long-distance connections with Amtrak, the west coast, Tahoe/Reno, Stockton, San Luis Obispo, Utah, Nevada, and SMF.

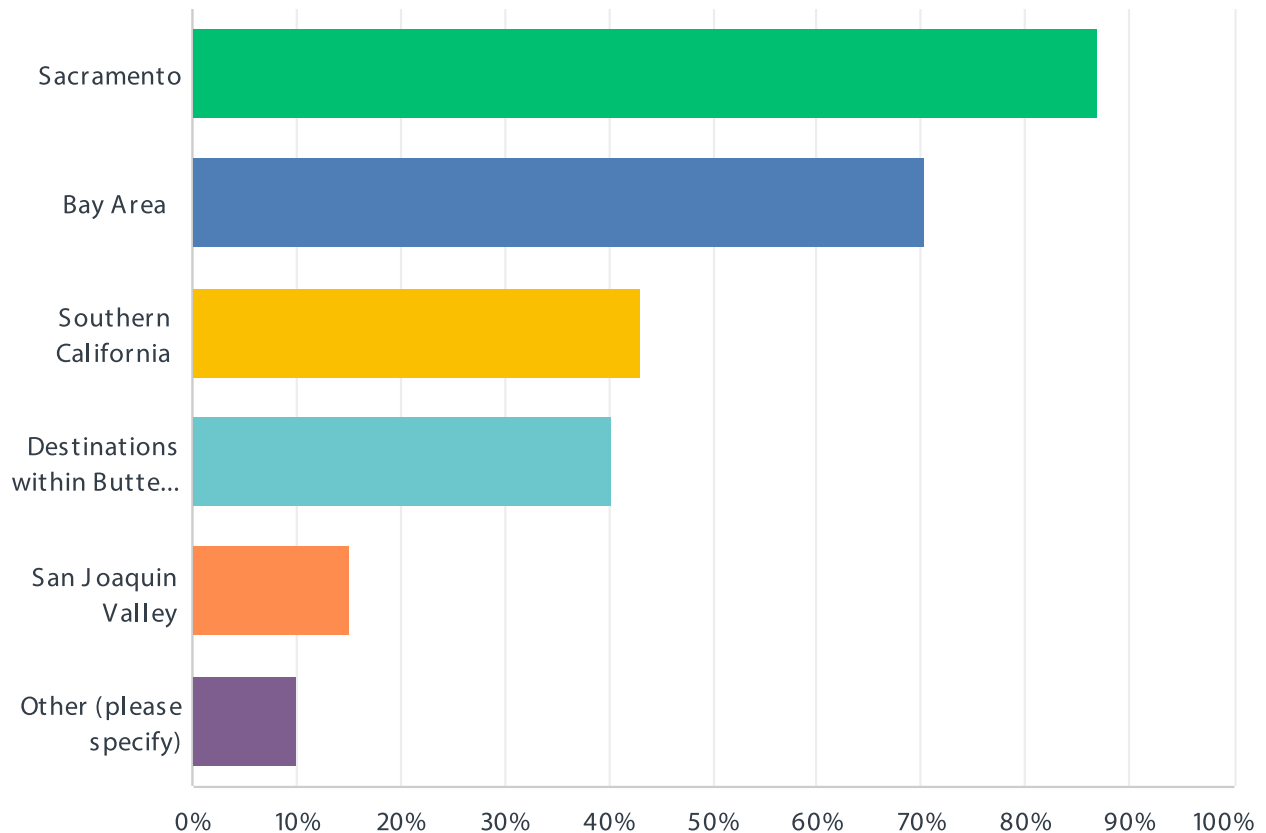


Figure 4: Question 4 Graph Results

5

QUESTION 5: How do you plan to travel to the stations?

HIGHLIGHTS: Personal car and park was the dominant response, with 190 responses. The Car/dropped off with 172 responses, Bike with 30 responses, Car/share with 27 responses, Transit with 24 responses, and Walk with 20 responses. Other responses included Paratransit, Bus, and Amtrak.

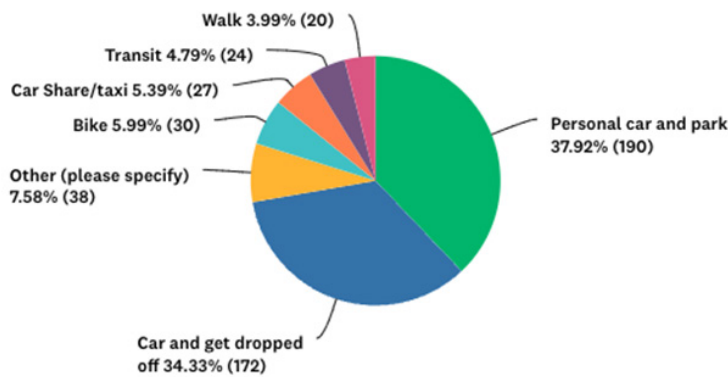


Figure 5: Question 5 Graph Results

6

QUESTION 6A: If buses were aligned with train arrivals/departures, would you consider taking transit to the station?

HIGHLIGHTS: Of the 506 responses, 392 said yes, while 115 said no.

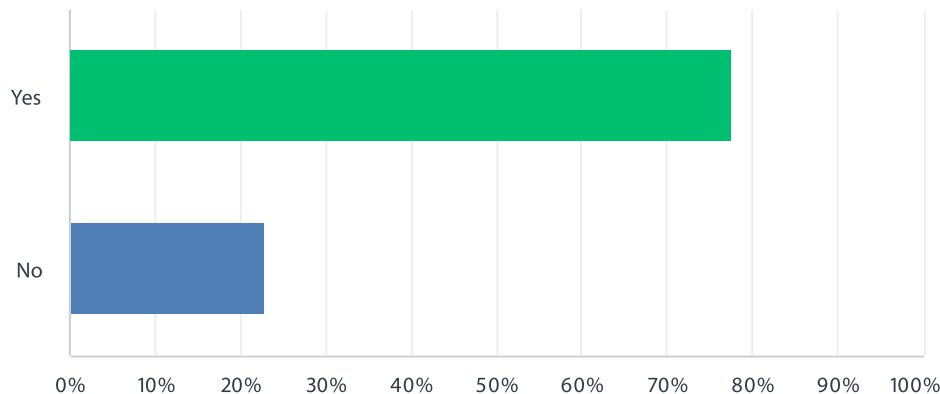


Figure 6: Question 6 Graph Results

QUESTION 6B: If no, why not?

HIGHLIGHTS: Barriers to considering transit to get to the station included concerns around bus scheduling, perceived personal safety concerns, handling luggage, cost, travel distance in rural areas, and preference for using automobiles.

See [Appendix A](#) at the end of this document for a complete list of responses.

7

QUESTION 7: What would prevent you from using North Valley Rail service?

HIGHLIGHTS: The route not fitting their needs was the dominant response, with 255 responses. The wait time was too long with 248 responses, too expensive with 208 responses, Station locations not fitting their needs with 150 responses, Lack of long-term parking with 89 responses, and Parking challenges with 87 responses. Other responses included personal safety and lack of other rail connections.

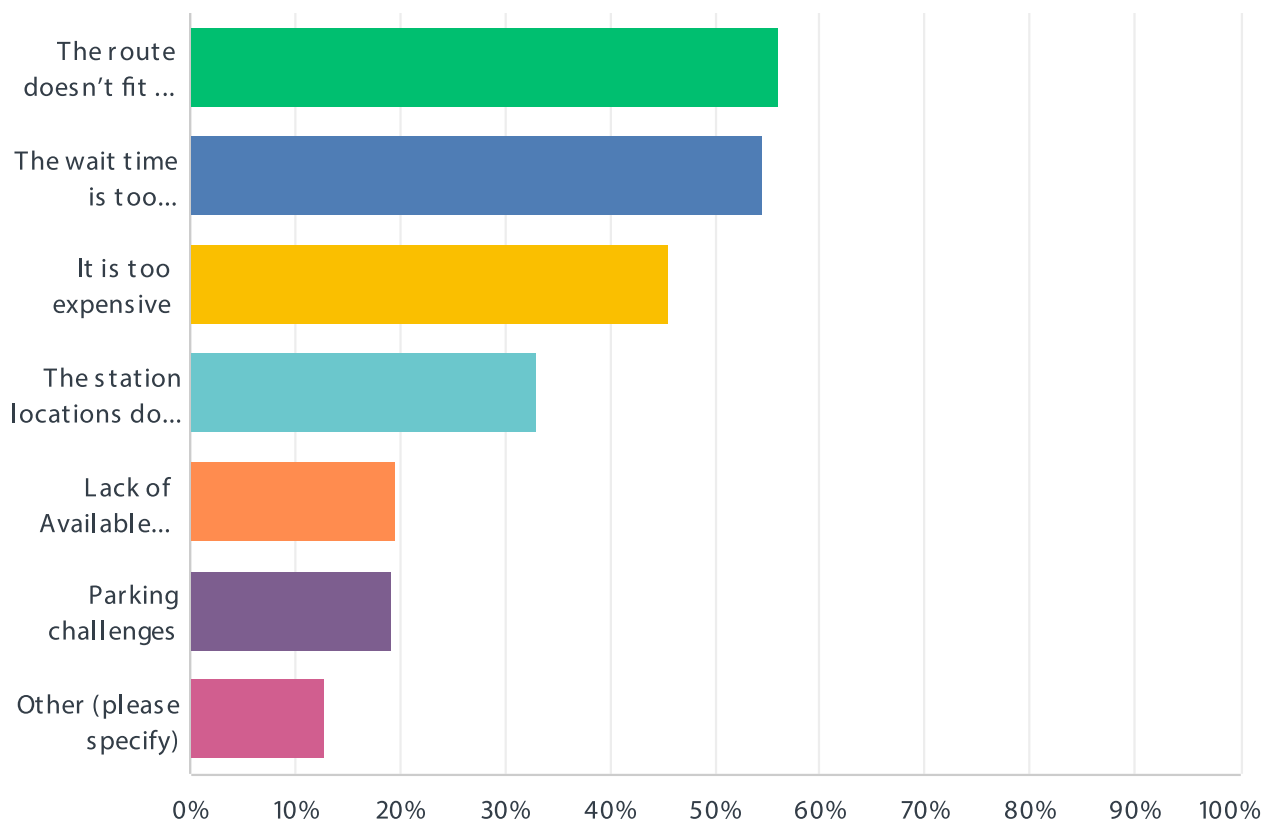


Figure 7: Question 7 Graph Results

8

QUESTION 8: What would you like to see included at the stations?

HIGHLIGHTS: Benches/seating was the dominant response, with 309 responses. Ample car parking with 304 responses, Shade structures with 293 responses, Landscaping with 198 responses, and Bike Parking with 174 responses. Other 116 responses like bathrooms, enhanced security, EV charging, ticket purchase kiosks, bicycle lockers, food vending, child-friendly spaces, disabled accessibility, and fewer “homeless” in train stations.

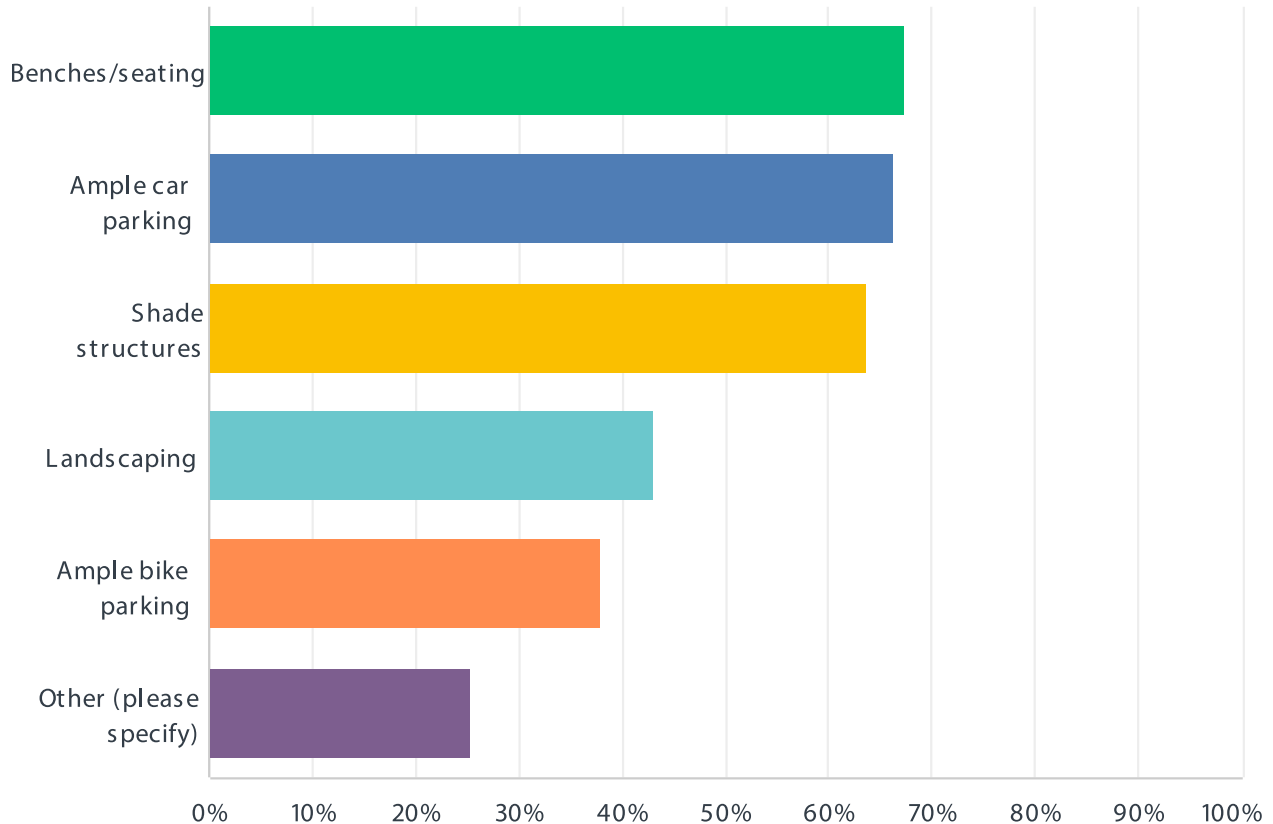


Figure 8: Question 8 Graph Results

9

QUESTION 9: How often would you use the North Valley Rail service?

HIGHLIGHTS: Occasionally was dominant with 189 responses. Once a Month followed by 134, then Once a Week with 51, Several Times a Week with 46, Other with 37, and I Would Not Use with 22 responses.

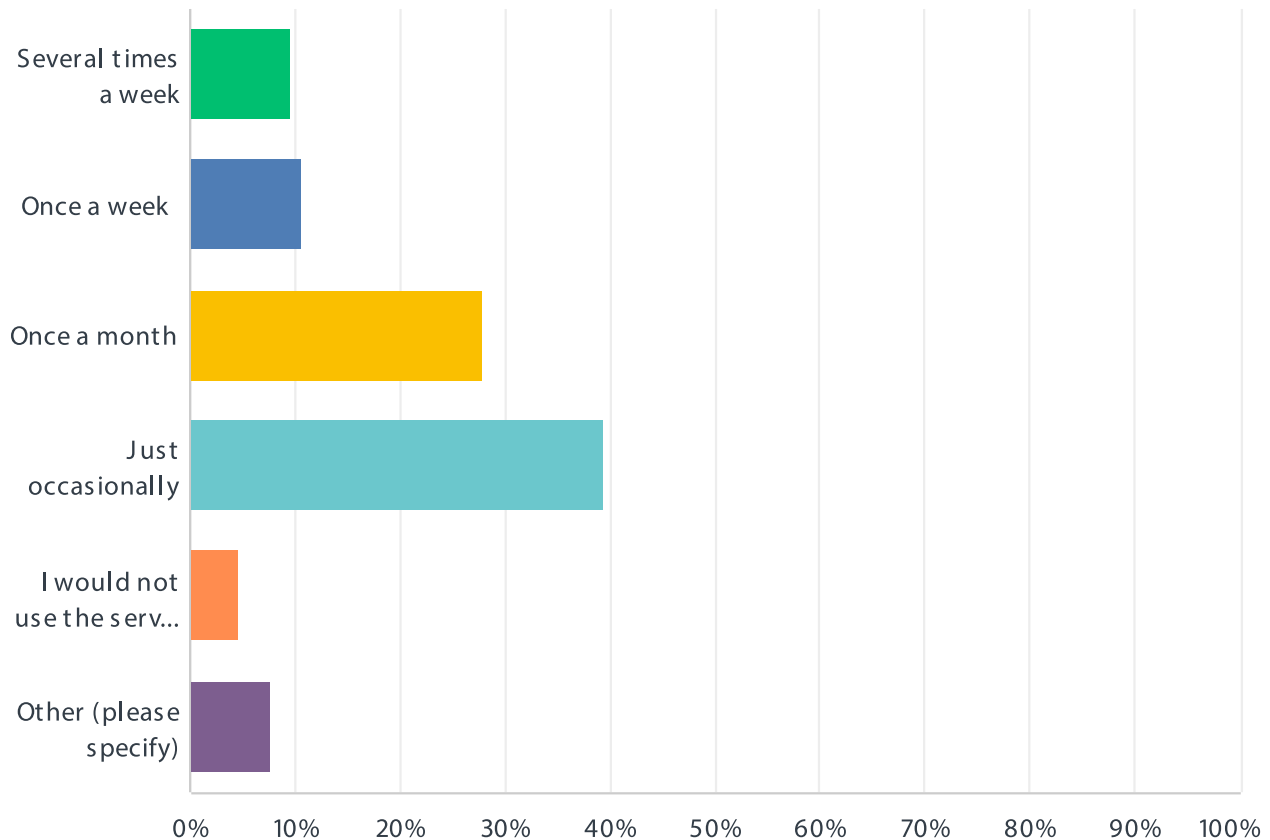


Figure 9: Question 9 Graph Results

10

QUESTION 10: Please share with us any additional comments you have about this proposed passenger rail service.

See [Appendix B](#) at the end of this document for a full list of responses.

PUBLICITY AND NOTICING

It was important that community awareness and outreach spanned across multiple counties and included priority populations in the process. AIM Consulting developed a Stakeholder Database of 156 community-based organizations, human service agencies, public agencies, schools, and cultural groups representing the various demographics that live and travel in the proposed plan area. AIM sent internal emails, two email campaigns, posted on social media groups and communities that were inside of the proposed plan area, and made calls to stakeholder representatives between April 13–May 4 to notify them about the community questionnaire and to ask them to promote it through their communication channels.



NEXT STEPS

The feedback from the February community meeting and this questionnaire will inform the strategic plan for the North Valley Rail. More information and project updates can be found at the project website, **northvalleyrail.org**, where people can subscribe to email updates.

Below are the organizations that promoted the workshop:

- Butte County
- Chico 211
- Chico Enterprise-Record
- Chico News & Review
- City of Chico – Deputy City Manager
- City of Chico – Government
- City of Chico – Public Works
- CSU Chico
- HACE – Hispanic Association for the Community and Education
- Hispanic Chamber of Commerce of Northern California (Chico)



northvalleyrail.org

APPENDIX A

Open-Ended Question 6A: If buses were aligned with train arrivals/ departures, would you consider taking transit to the station?

Question 6B: If no, why not?

- Taking luggage on a bus is difficult. Coordination bus schedules with bus schedules is impossible.
- I'm very close
- Chico needs better rail connection with Bay Area - Coast Starlight stops in the middle the night
- I have no need for this type of transportation.
- Don't go that way
- I live in a rural area and would use my own car to travel to the station.
- Busses suck
- Frightening characters ride the bus in Chico. If the clientele is different, I may consider the bus. I have ridden the bus in other urban areas, both domestic and international. Some areas have a culture of public transport and high level of service.
- Scared of buses
- Don't want to carry my luggage onto the bus.
- My car is more convenient.
- We live in Oroville it's a 30 minute drive to Chico? Add another 30 minutes and I don't have to wait for a train and I take my own car. This will help people in Chico NOT Oroville, Bangor.
- Privacy
- Can't see this working.
- Too many homeless on the city buses. It's no longer safe to ride city buses.
- I have other ways to get there that are safer
- I don't plan on using.
- Because I will take my own vehicle
- I like my car
- I hate them
- Bus takes too long

- Because that adds too much time to the trip.
- I would be concerned about transfers
- I prefer to invest in the airport in Chico
- Their There should be as few of stops as possible.
- Irrational fear of buses
- I don't mind the walk
- Luggage
- Don't feel safe on buses
- Convenience
- It's an option for very occasional use to the Sac airport but the North State has other more immediate needs.
- No bus stations near my home.
- too hard.
- It will end up being unsafe travel due to criminal activity
- chico small town
- Don't want to bring more people here
- Takes way too much time versus driving. Connections shut down leaving you stranded. No plan for 24 hour24-hour service to airport. Flight delays mean overnight at a hotel. Would rather move to Redding and get proper air service.
- No bus would have a stop close enough to where I live.
- Expense, schedule
- Public transit is very inefficient unless it runs on a timely and useful schedule. Our population density in Butte County is insufficient to support such service. Look at our local transit buses - they are basically empty most of the time
- I do not plan to use the train
- Don't like taking buses
- Not great clientele
- I live in Chico, so it is easier to have someone drop me off vs. trying to utilize city bus.
- I like too far from the bus stop.
- Cars = freedom and security.

- I find buses take longer than driving
- I don't like bus travel and it extends travel time
- I don't plan to use a rail service for travel. My experience using rail travel is that it is not worth the effort and lost time.
- In Chico, it would be easier to get a ride or Uber/ Lyft. I would not want to leave my car near the train station either.
- I don't like buses
- I prefer my car.
- I live in a rural area. Bus travel is impractical
- No. Connections and bus service is slow, and a pain. No interest
- Not my preferred choice
- I think it would add too much time and inconvenience.
- Easier to get a ride
- I bike easily and there is no bus close to my home.
- Don't live close enough to bus transit
- More convenient to use my own vehicle. I do not live near bus stations currently.
- Limited stops near my home.
- It would depend on whether or not I had luggage to also take with me.
- Too much time
- No bus route easy from my home.
- transit does not serve my area
- Live in country
- Convenience
- Takes too long

APPENDIX B

Open-Ended Question 10:

Please share with us any additional comments you have about this proposed passenger rail service.

- I wish a train had been available when I was commuting to the Bay Area. It's important to have early service in order for people who work a distance to use the train. Starting at 7:00 a.m. would be terrible; no point. 5:00 a.m., or earlier, would be better. I'm a huge rail fan for commute transportation.
- Your information suggests a terminal stop at Natomas. If the service does not connect with existing Amtrak service at Sacramento, it is doomed to failure.
- Parking and security -
- Great long term savings versus continuous road building and maintenance. Convenient, I've traveled on many commuter trains and they are so much better than driving.
- if parking lot, i would like cameras to be there, as i would be able to leave my car safely. Then i could take overnight trips out of town
- It is crazy we don't have rails service all around USA.
- My commute from chico to Sacramento to work is already very long. To use this as a commuter line which I very much hope to do daily, I can really only do so if it doesn't stop very much or at all in-between. Also, the timing is a critical factor as well. I hope it will start early enough and run late enough. I must be at work by 6:30am and my shift ends at 7:15pm and vice versa when I work nights.
- I will be surprised if this pipe dream does anything other than burn taxpayer money on an ineffectual, overpriced project that feeds backroom negotiated contracts.
- WIFI service would be a nice service on the trains. Clean, secure, safe and pleasant stations and trains would help reputation and ridership. Ample shade is necessary in the valley, you should consider ceiling fans.
- If you want me to ride my bike the bike parking will have to be lockers or inside. You cannot leave a locked bike outside ANYWHERE in Chico and expect it to survive the night.
- I like the idea of affordable, daily passenger rail service extending from Redding to Sacramento. This is an innovation that is long overdue in this part of the state.
- I love the ride to and from
- I am thrilled that this is in the planning stages, about to become a reality! It's been a long time coming - finally!

- I love trains. This is a great idea!
- It's a great idea, but safety and cleanliness will be important.
- I think this is a great idea and would love to see it happen!
- Can't wait to use the rails to get around!!
- I predominantly use the train to visit my family in Stockton but due to scheduling complications the only current option could not be more inconvenient, so I'm looking forward to seeing how this all turns out.
- This is not intended for Oroville use. We have to drive to Chico? We are the county SEAT!! Entice us by having a stop here???
- There is a dire need for a daily connection from Oroville to Sacramento!
- It would be nice to have stations with snacks and restrooms
- I just can't see this working.
- PLEASE. Get things going ...FAST It's really needed
- A heavy police and security presence
- Some of the extension area is very rural. Not sure it's worth tax dollars, but it could be helpful.
- Would use this service strictly as recreational diversion.
- I'm excited that rail service may return.
- Hope it goes through while I'm still around!
- Would like to see stations in Gridley, Chico, and Yuba City or Marysville, in addition to Sacramento, including a transfer to airport
- I've been wishing for this forever!
- Seems like a good idea to me.
- Excited for the possibilities!
- Due to Governor Nuisance bills passed, we have had a huge influx of homeless people living near the stations here in Nor Cal. I know they use the train yards as hotspots. I've heard firsthand. I'm hoping that'll change before this becomes yet another way for them to continue feeding off the system and tax paying citizens.
- Student and elderly rates please
- Is there really a need? All this money to have the trains run mostly empty. Biggest concern is having to coordinate air travel with train times, and I may need to get a hotel to wait an evening for the next train or plane. This does not meet my commute needs.
- This would be an amazing project that the north state truly needs.

- Love this plan! Can't wait for it to be completed already, it would be so nice having alternative options of commute to the Sac airport/Bay Area/SoCal without having to drive or fly.
- Making it affordable will increase ridership. I would much prefer to take a train and public transit to anywhere I go because driving is expensive and also kind of scary, but I am often forced to do taxis and ride shares because buses are often crowded, dirty, and have inconvenient or unreliable or difficult to understand schedules, and trains are often more expensive than driving. It makes it really hard to use public transit even though it's what I would prefer to do.
- It's past time we had better railway options. I'm glad we're making this happen.
- I don't want this. I would rather have an operational airport
- Too many stops in smaller towns, will slow down the speed of the train
- A key to people using them in Chico will be keeping the stations clean and people feeling safe.
- It should be ADA compliant and have the ability to take bikes on the train with passengers in order to create more eco-friendly transportation. It should also have more frequent travel times so as to create a more accessible way to commute and travel. If there's going to be a commuter train then it needs to suit the needs of the commuters.
- Great idea and much needed!
- Various departure times and arrival times, public transportation, safety at the stations, and parking. What about children on the rail, pets, and luggage?
- I noticed you did not mention disability access...it will be important to have accommodations for people with disabilities..priority seating especially!
- Bikelink.com Lockers at Stations
- depending on the route, cost, and accessible transit at the other end I might be able to broaden my use to visit family and friends.
- I love the idea.
- I'm hoping the schedule would run frequently, over 24 hours. I am also hoping the fares would be reasonable enough to deter other travel methods.
- I'm concerned with the cost.
- Law Enforcement-2 Officers per vehicle plus K9; 2. Unfetter law enforcement so they can do their job, let Chico be known as a no-bs city; 3. No Crime Lights and Video Recording; 4. Cite, Ticket, Haul off to Jail.. and make courts enforce! Even littering should have work detail assigned. If you don't get this far with what we have now, you are only dooming all that Chico can be by adding more to its plate
- I commute from Chico to Live Oak everyday and would love another option for travel. So more stops.... The schedule would be my main concern.
- We have several out of town visitors. This type of travel would be very helpful in getting them from the Sacramento Airport to Chico.

- We need this opportunity to help commuters, lower gas emissions, enable people to find new jobs, access to medical services lacking in Butte County, access to other services needed/available in Yuba, Sacramento Counties
- Build it and they will come!
- Growing up in the Bay Area, I often used public transportation, including the VTA Rail. I have always felt discouraged that there is no viable public transportation neither within nor outward from Butte County.
- I have concerns that the rail will increase the amount of transient population in our area and that the trains will become security concerns for those wishing to commute.
- Looking forward to having rail service
- Cocktails available Snacks Coffee
- coffee shop
- It needs to go directly to Sacramento airport
- I thought it was such a disservice not having a train station in Gridley
- looking forward to fast trains
- Thank you!
- Not sure this is a good use of public funding. If this would be a government funded project it would probably be extremely wasteful and provide little benefit in the long run
- The chico rail depot is a collector for transients, bums and druggies.
- It needs to be on time.
- Should not be attempted until CIC gets flight service back. Shows Chico can't have a wholistic strategy without being dependent on Sacramento. Makes Redding look like geniuses and us like idiots.
- I think it is about time that Butte County explore options for travel to Sacramento.
- Safety is important and security of passengers
- Please make busses or extra transport to/from the closest station to SMF and SFO airports included in the train price so people don't have to make a separate purchase if that is their destination
- This would be a huge plus for my family - we use current Amtrak system a minimum of twice per month and would love to have the option for the train from here south. Extra bonus if there was no need to switch trains or have a layover.
- I love the rail system it needs more locations, I drive to Sacramento to ride to the bay. I should be able to get on in Chico and ride to the bay with a transfer in Sacramento.
- I would like to travel by rail within California but Amtrak does not offer regular service. This project if it ran multiple trains per day would be terrific. I would use this service for day trips between cities.

- A connection to the Sac Airport will generate the most trips
- I can't wait for train service to the Bay Area that's not in the middle of the night like it is now.
- This rail service would provide a significant practical and symbolic purpose. As someone who loves to travel, doesn't own a car, and hates traffic, I rely on public transit to see all of California. However, I am unable to visit Northern California because of the current public transit gap between Yuba City and Chico, with exception of the infrequent Amtrak buses. Because of this, there is no way for one to travel from Central California to Northern California without a car. But with the advent of more rail projects in the future, the North Valley Rail can literally connect all of California! With this project it would be possible to travel from San Diego to Crescent City using only local public transit. Think of the marketing opportunities for tourism!
- Chico to Sacramento Airport is a route I would definitely use.
- Will it be high speed?
- frequent shuttle bus to airport SMF
- Important to include Chico State in the plans since so many students come from points south.
- This would be a FANTASTIC way to efficiently get to and from SMF if there were multiple times per day.
- this possibility is exciting: I hope it becomes a reality
- Crime, homeless, vandalism
- It would be awesome we are trying very hard to use rapid transit and other forms of transportation in place of cars and airplanes
- Overdue.
- Trains must be timely, allow bikes without having to box them up, and clean.
- Mostly schedule and cost
- Don't do it! Public transportation works in metropolitan areas because of the population density, excessive car traffic, and lack of vehicle parking places. Sans those ingredients, it would be a huge waste of resources.
- Hook it up to SMART in Sonoma/Marin for a vastly expanded network!!!
- I would much rather have our roads, current infrastructure repaired before spending money on this new project.
- FINALLY!!!
- We need this!
- Implement ASAP
- I'm very excited for this project. My only disappointment is that it will take 5 years to complete.

- This would be a great asset to get to Sac Airport
- I live traveling to different destinations
- If the train went directly to the Sacramento airport I would probably use it, but to have to transfer to a bus complicates the travel. Keeping travel time closely aligned with automobile travel times is also an incentive
- I feel that it is a waste of Tax Payer dollars to try to incorporate a rail system for Rural Northern California.
- We NEED something that connects our county to the rest of the state. As it is now our area is far too isolated, and this limits our opportunities.
- Would the North Valley Rail service allow for transportation of bikes
- a dog park would be great!
- From Downtown Sac there is now regular bus service from the airport. If I could just get to Sac from Chico, it would make getting in and out of Chico so much easier!
- A passenger rail service would be helpful in getting to the airport
- The sooner the better.
- I'm excited that this rail idea is in the works. Living butte county makes you feel stuck and totally dependent on a car.
- I am so excited about the possibility of expanded rail service!!! It's such a great way to get around, and it currently just sucks. You either have to take a bus or get up super early in the morning for an unstaffed train to travel to Sac or the Bay. Can't wait to travel by train!
- The climate has been changing for millions of years and will continue to do so regardless of what us mere humans do to change that.
- Making sure it's clean & there isn't weird people to have to deal with that makes it dangerous for women & children
- This is not high-speed rail and is not frequent enough for my needs. This is simply a commute option to sell houses in Chico. Not interested in this design
- Increasing a community's access to a shared transportation resource has exponential benefits, in terms of ancillary business potential/ a node for community-strengthening through business and social interactions.
- I feel that this would greatly benefit our community both from an ecological perspective as well as a transportation perspective.
- Love this! This will be a great way to cut down on traffic, air pollution, and be an overall safer way to travel. I commute to the San Joaquin Valley every month. Hate driving it! Being on a commercial train will make it more feasible to spend more time doing what I need to do.

- Love the idea and would use it often to visit local, regional, state, national and international areas. Great idea that I hope can take hold. Would prefer riding over driving any day!
- Incorporating local community's within the stops. Sacramento airport has vending machines that offer local artists and makers wares. That way people can learn a little about small LOCAL businesses to support
- If you are going to build this service (and spend the money they are talking about), seems like it would make more sense to run on the UP Valley Sub. There are opportunities for more stations in populated areas, potential sponsorship of parking and other infrastructure, and utilize more existing Amtrak stations. In addition, it would give alternate service for the Coast Starlight by serving a few different stations, but still connecting on either end, and connecting with the California Zephyr, San Joaquins and Capital Corridor as well.
- Only concern is the criminals spreading out and gangs getting around easier
- It would be very helpful with traffic and energy saving
- Do it now!
- military discount would be a plus & a huge incentive for me to use more consistently.
- This would be a wonderful service to get to SMF and possibly to go to Sacramento for entertainment and shopping, if buses are convenient.
- Please come to Redding!!!
- Never heard of this before this survey.
- Being able to carry bikes on the train is important to me. My most frequent destination would be the Bay Area, (Oakland/Berkeley) so a useful and well timed connection to the Capitol Corridor is important
- This seems like a wonderful idea
- Very excited for simple accessibility to Sacramento from Chico.
- Dog friendly would be awesome!
- This would be awesome for one day trips. I always wanna go to Sac but I also want to be environmentally friendly.
- Possible extension to Redding?
- I would like to see a good connection with Sacramento Airport as this is the most likely use for me use rail services. travel at least twice a month to Sac International
- I think it's critical to have the station Downtown. It will promote community in the downtown area, support the businesses there, be more easily accessible for folks not driving who love anywhere in the city, and be a structure to build around for generations
- We should be spending more state money on stuff like this and less on highways.

- It is an excellent idea. There is no easy way to get to Sacramento or San Francisco now besides driving.
- Electrify this route as much as possible
- needs to have Wi-Fi and bathrooms, safe stations that meet up with other transportation services like transit or bike share.....something.
- If service included a stop at or near SMF my family, friends, and I would likely use rail service exclusively for transit to SMF
- I would like to be able to take a cargo bike on-board. It would great if reservations are not required (I think Capitol Corridor does this.) with no assigned seating. I can get on whenever and pay on the train.
- I love the idea of train travel, it's great for the environment. However, since Oroville has been bypassed for this opportunity, you have lost a large majority of clientele that don't drive.
- Although I shared many concerns that might keep me from using this rail service, I really want it to happen and be successful, and would work hard to make it work for me out of concern for the climate, and also to reduce the stress of driving long distances. Thank you for asking.
- We need a train to Oregon
- Trains ending in Butte County are not viable. The need is for more interstate trains to serve our region. The present two trains serving Chico are frequently "Sold Out". That is where the need is and what is viable!
- I am at a stage in my life where I have no need to travel outside of Butte County
- I think it is long overdue-- I am very excited for it to begin
- Please ensure that routes from Chico stop at convenient and accessible stations in Sacramento. The route needs to stop at the Sac Valley Station to be useable for most people in the north state. The Natomas station is not convenient and will not serve us. This should connect to downtown sac/sac valley.
- Love the opportunity to ride train



NORTH VALLEY RAIL

**CHICO • GRIDLEY • MARYSVILLE/YUBA CITY
PLUMAS LAKE • SACRAMENTO**

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North Valley Passenger Rail Strategic Plan

CHICO • GRIDLEY • MARYSVILLE/YUBA CITY
PLUMAS LAKE • SACRAMENTO

Appendix B Potential Track Improvements Evaluation

Final Report

May 2024

North Valley Passenger Rail Strategic Plan

Potential Track Improvements Evaluation

September 16, 2022

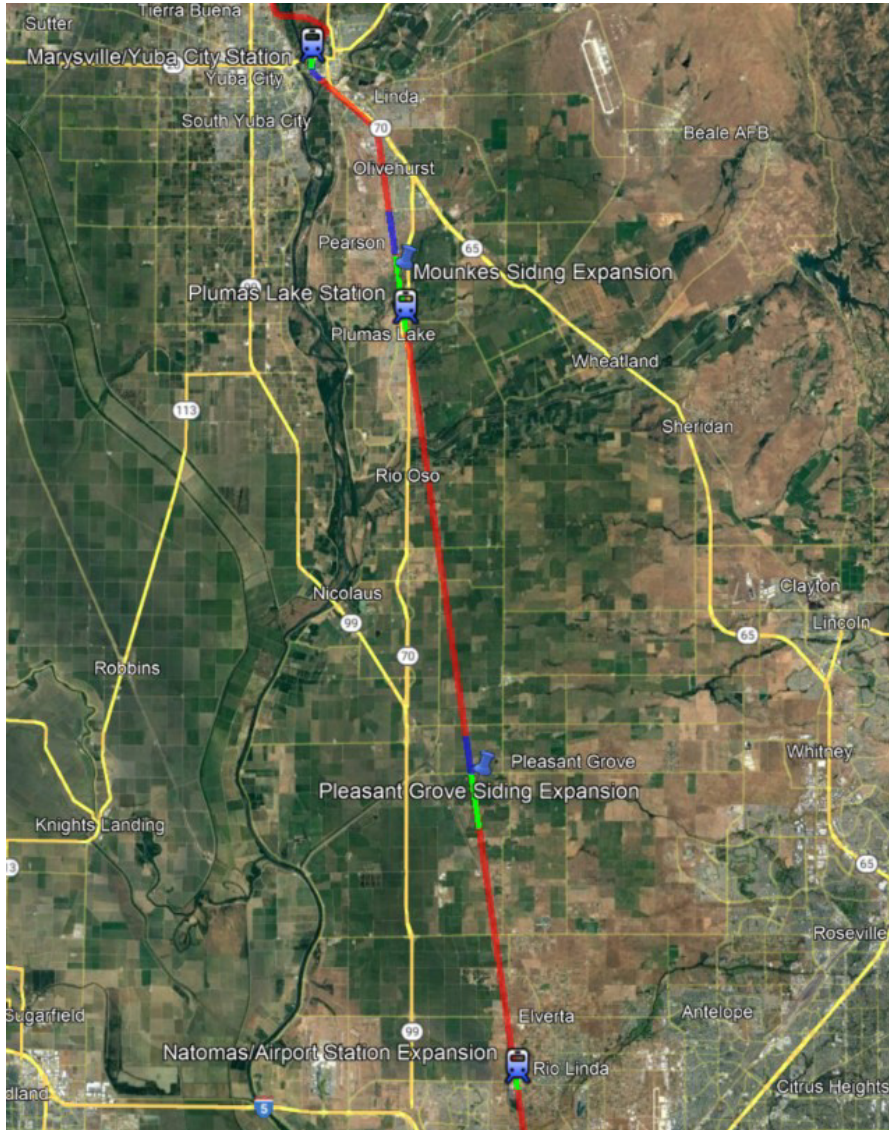
Potential Track Improvement Summary

Potential Track Improvement Summary

- **Natomas to Marysville (Sac Sub)**
 - Station track with Expanded Natomas Station
 - Expanded Pleasant Grove siding
 - Expanded Mounkes siding with Plumas Lake Station
 - Shifted siding with Marysville Station
- **Marysville to Chico (Valley Sub)**
 - Expanded Berg siding
 - Expanded Fagan siding with Gridley Station
 - Expanded Richvale siding
 - New Durham siding
 - Station track with Chico Station

Natomas to Marysville (Sac Sub) Track Improvements

Natomas to Marysville – Summary



- **Natomas Station Expansion**

- Add station track, platform and parking
- Pleasant Grove Siding
- Extend siding south to a final length of 15,000 ft

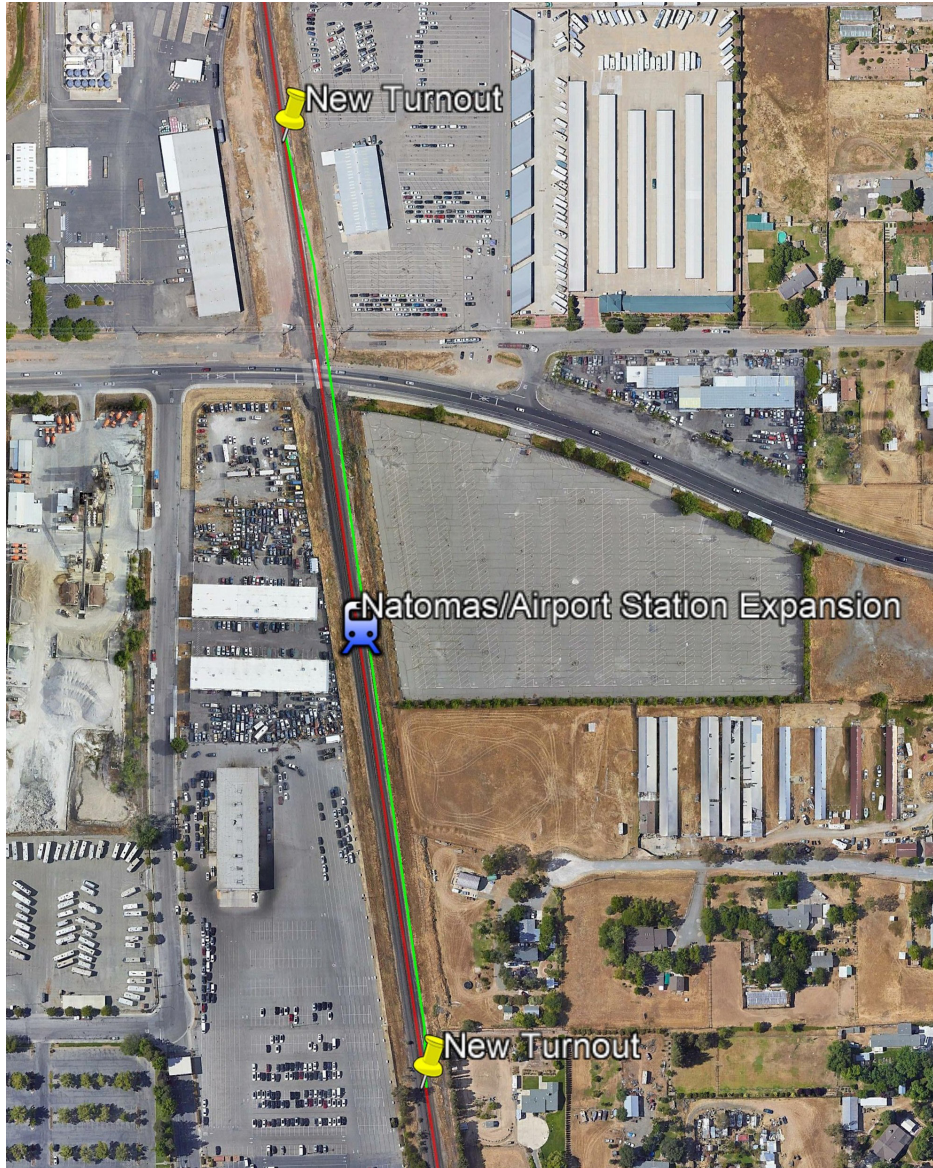
- **Mounkes Siding**

- Extend siding south to a final length of 19,800 ft
- Add station at Plumas Lake

- **Marysville Station and Siding**

- Shift mainline track
- Add center platform and parking

Natomas to Marysville – Natomas Station Expansion



- **Existing**
 - Single Track
- **Valley Rail Improvements**
 - Station Track & Layover West of Mainline
 - Platform & Station Facilities West of Mainline
- **Improvements**
 - Station Track 0.3 Miles (MP146.0 to MP146.3)
 - New Platform East of Mainline
 - Parking Expansion
 - Final Station Siding Length 1,500'

Natomas to Marysville – Pleasant Grove Siding Extension



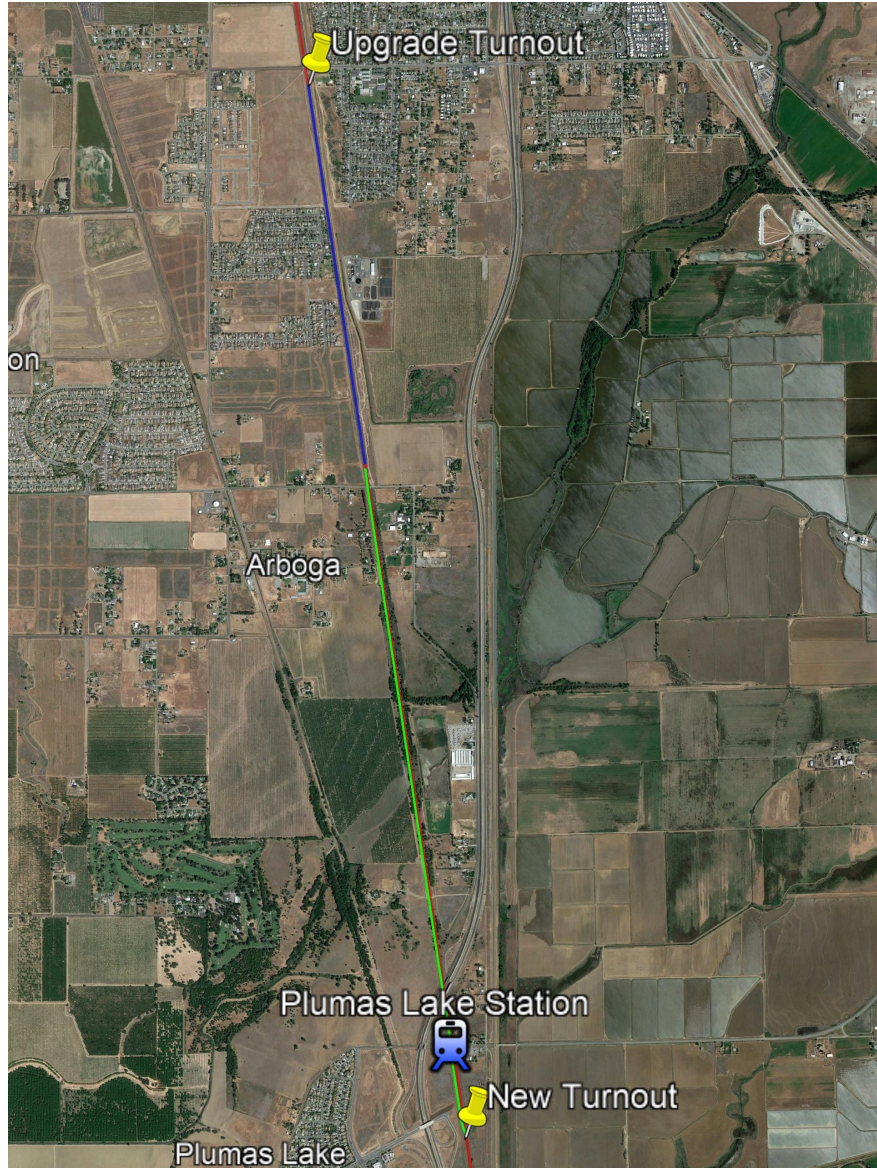
- **Existing**

- Siding Length - 1.2 Miles (MP155.9 to MP 157.1)

- **Improvements**

- South Extension Length 1.7 Miles (MP154.2 to MP155.9)
- Three New Bridges
- Upgrade Turnout at MP 157.2
- Final Siding Length 15,000'

Natomas to Marysville – Mounkes Siding Extension



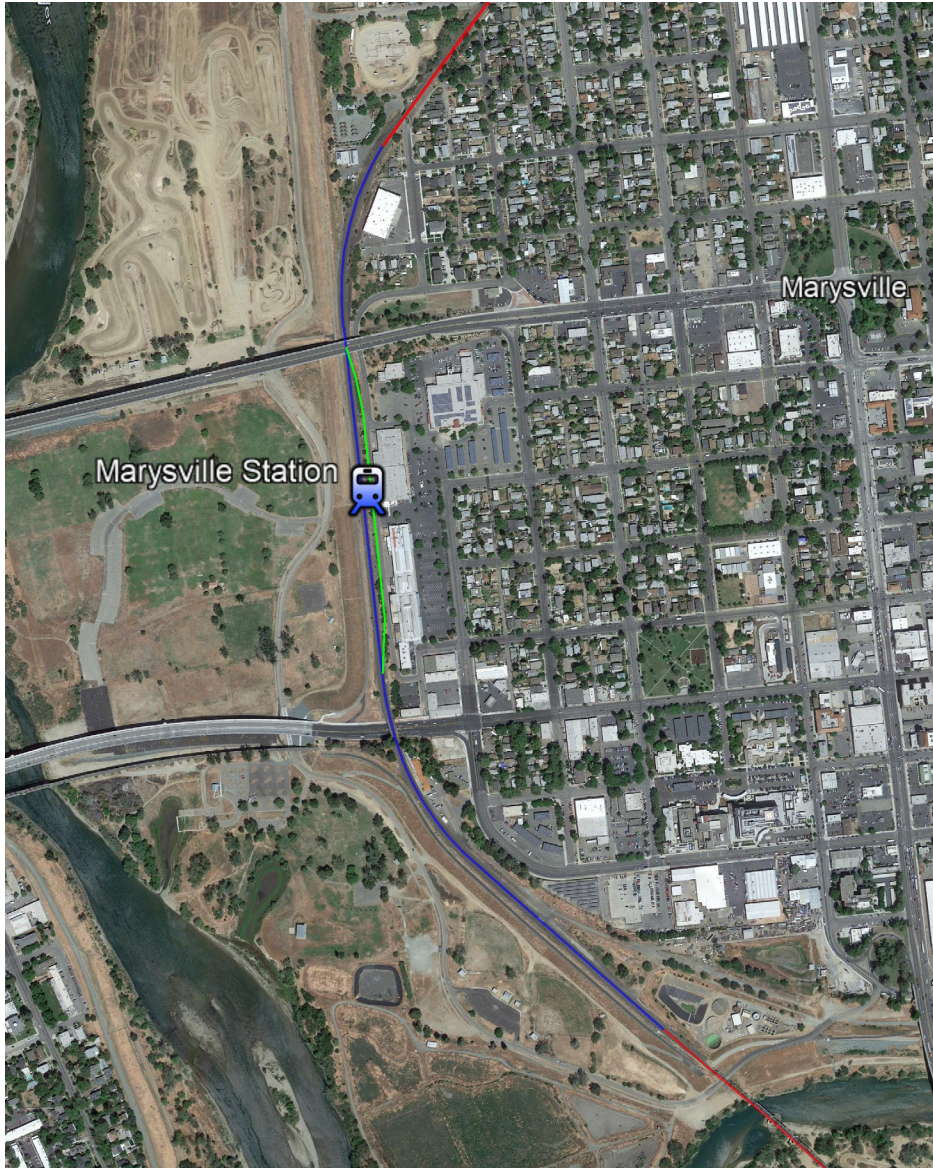
- **Existing**

- Siding Length - 1.5 Miles (MP172.1 to MP 173.6)

- **Improvements**

- South Extension Length 2.4 Miles (MP172.1 to MP169.7)
- Upgrade Turnout at MP 173.6
- Final Siding Length 19,800'
- New Station at Plumas Lake
 - Center Platform with Grade Separated Pedestrian Access
 - Parking to Support Station

Natomas to Marysville – Marysville Station and Siding Modification



- **Existing**

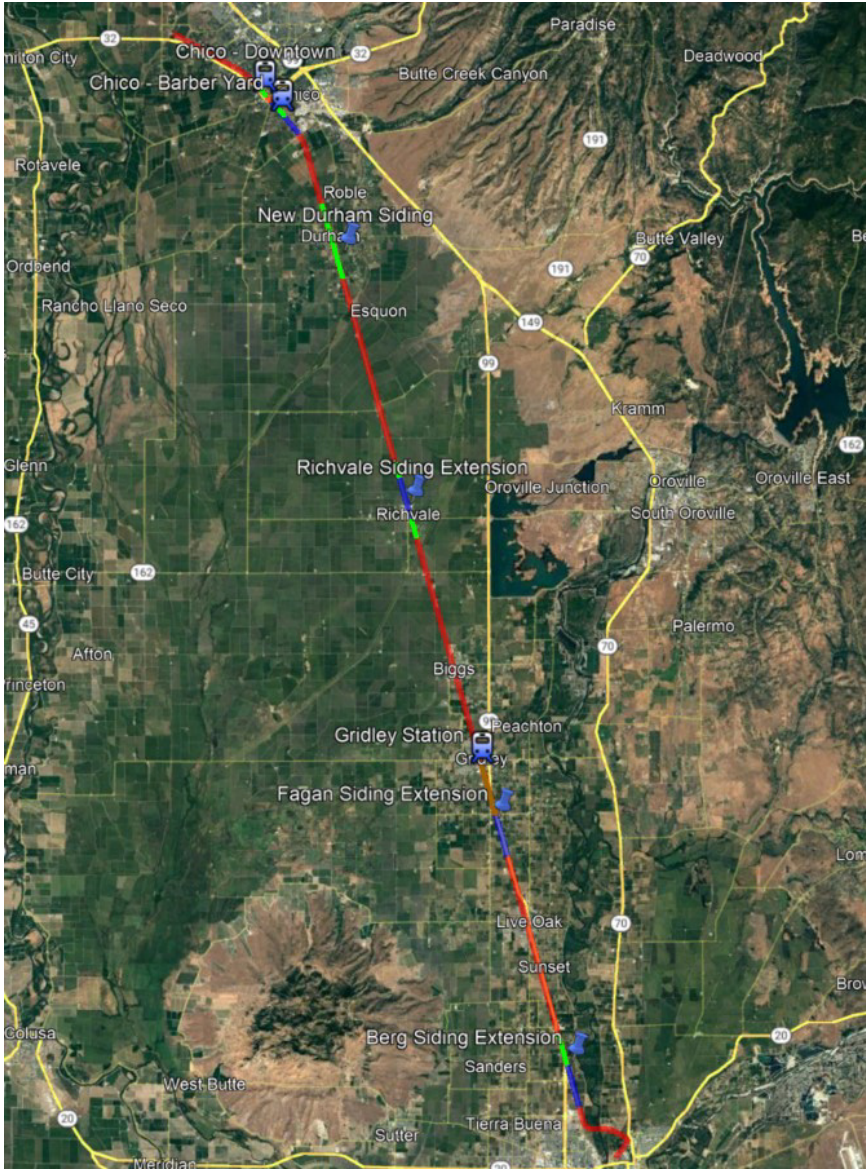
- Siding Length - 1.0 Miles (MP178.4 to MP 179.4)

- **Improvements**

- Shift Mainline Track East
- Center Platform with Grade Separated Pedestrian Access
- Parking to Support Station

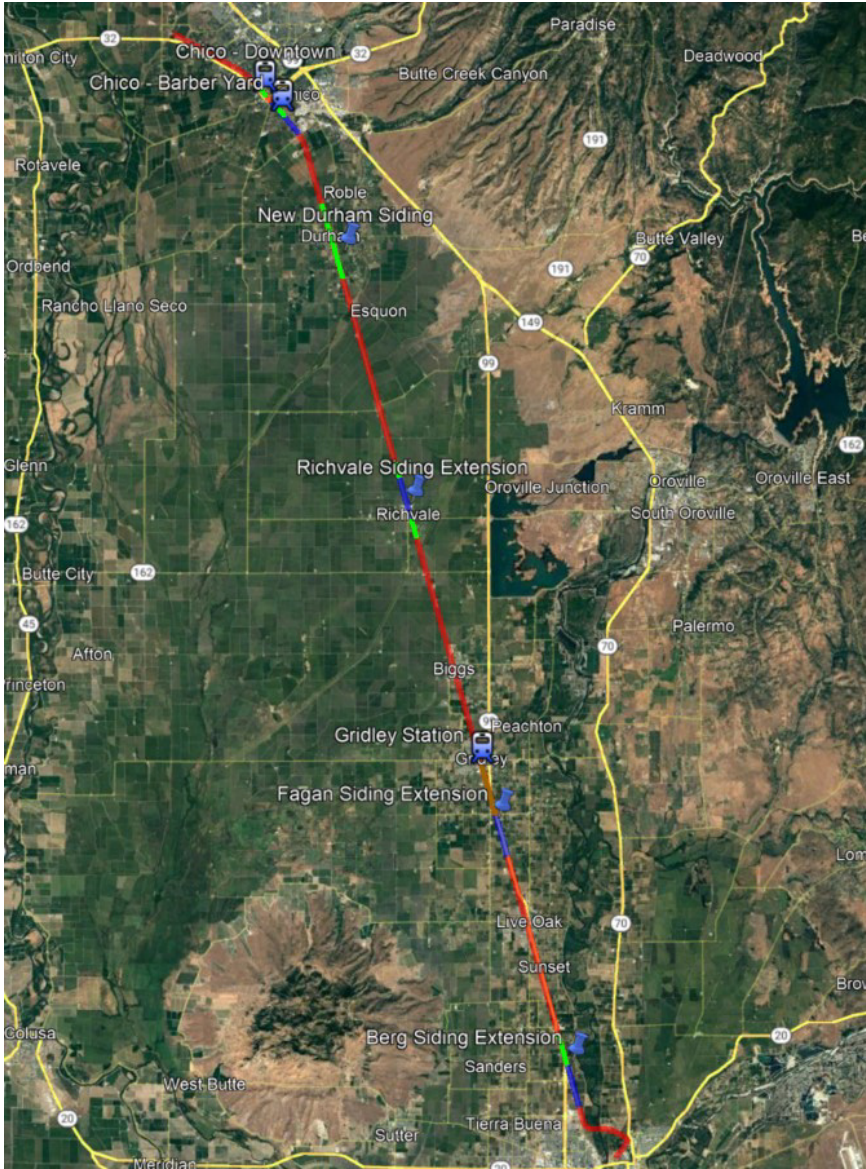
Marysville to Chico (Valley Sub) Track Improvements

Marysville to Chico – Summary



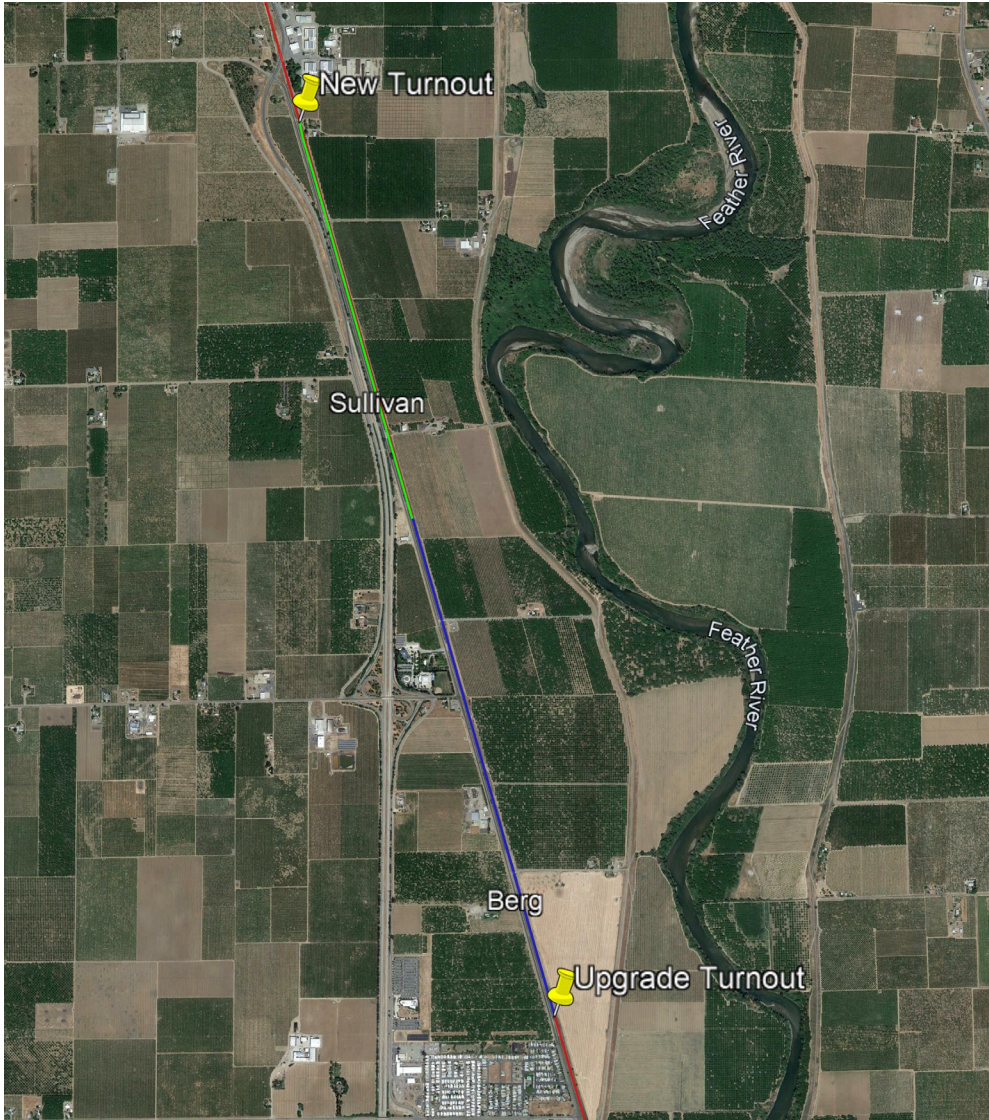
- **Berg Siding**
 - Extend siding north to a final length of 15,000 ft
- **Fagan Siding**
 - Extend siding north to a final length of 19,400 ft
 - Add platform and parking
- **Richvale Siding**
 - Extend siding north and south to a final length of 15,000 ft

Marysville to Chico – Summary



- **Durham Siding**
 - Install a new siding a final length of 15,000 ft
- **Downtown Chico Station Option**
 - Add station bypass track
- **Barber Yard Chico Station Option**
 - Add station track, platform and parking
 - Add layover track

Marysville to Chico – Berg Siding Extension



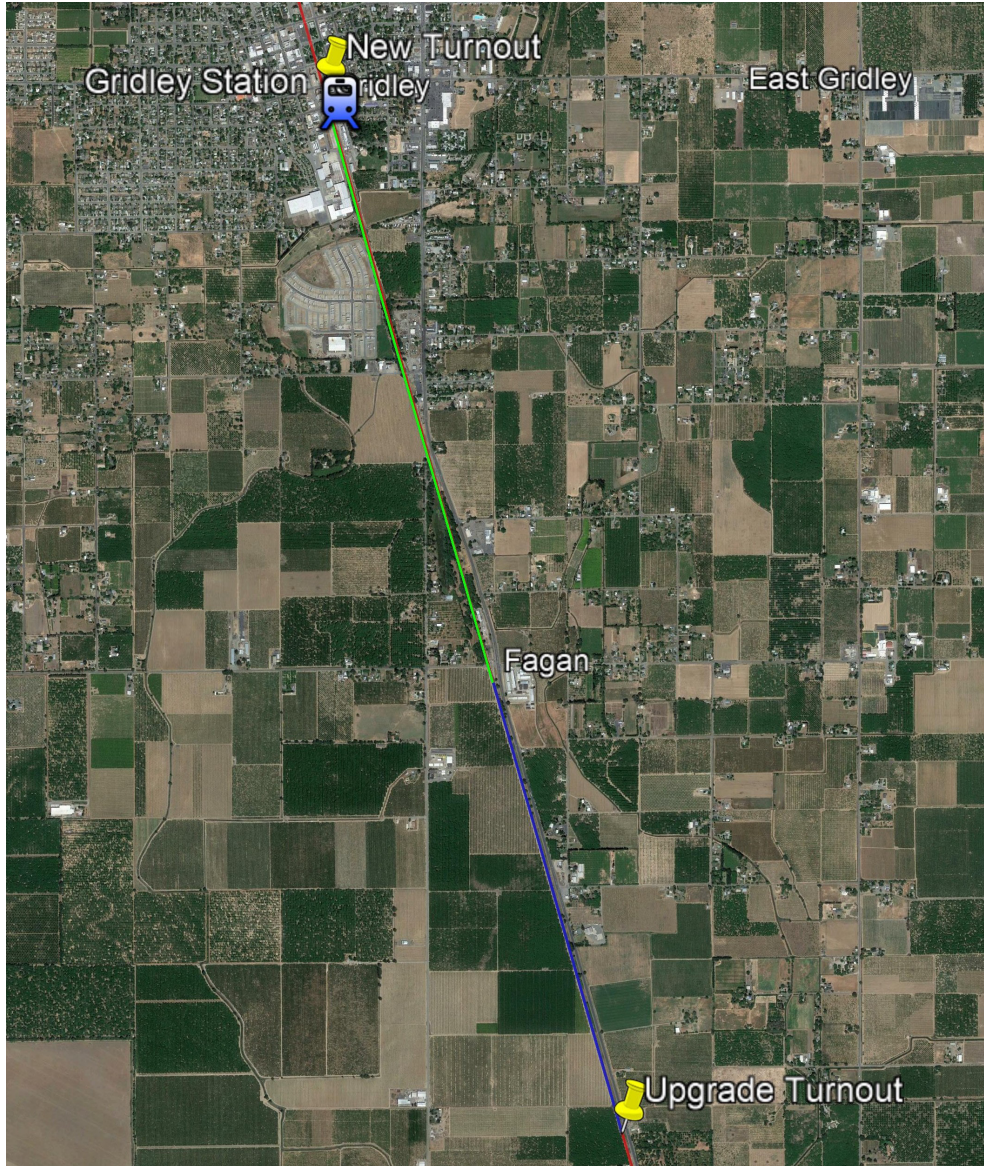
- **Existing**

- Siding Length - 1.7 Miles (MP144.3 to MP 146.0)

- **Improvements**

- North Extension Length 1.3 Miles (MP146.0 to MP147.3)
- Upgrade Turnout at MP 144.3
- Final Siding Length 15,000'

Marysville to Chico – Fagan Siding Extension



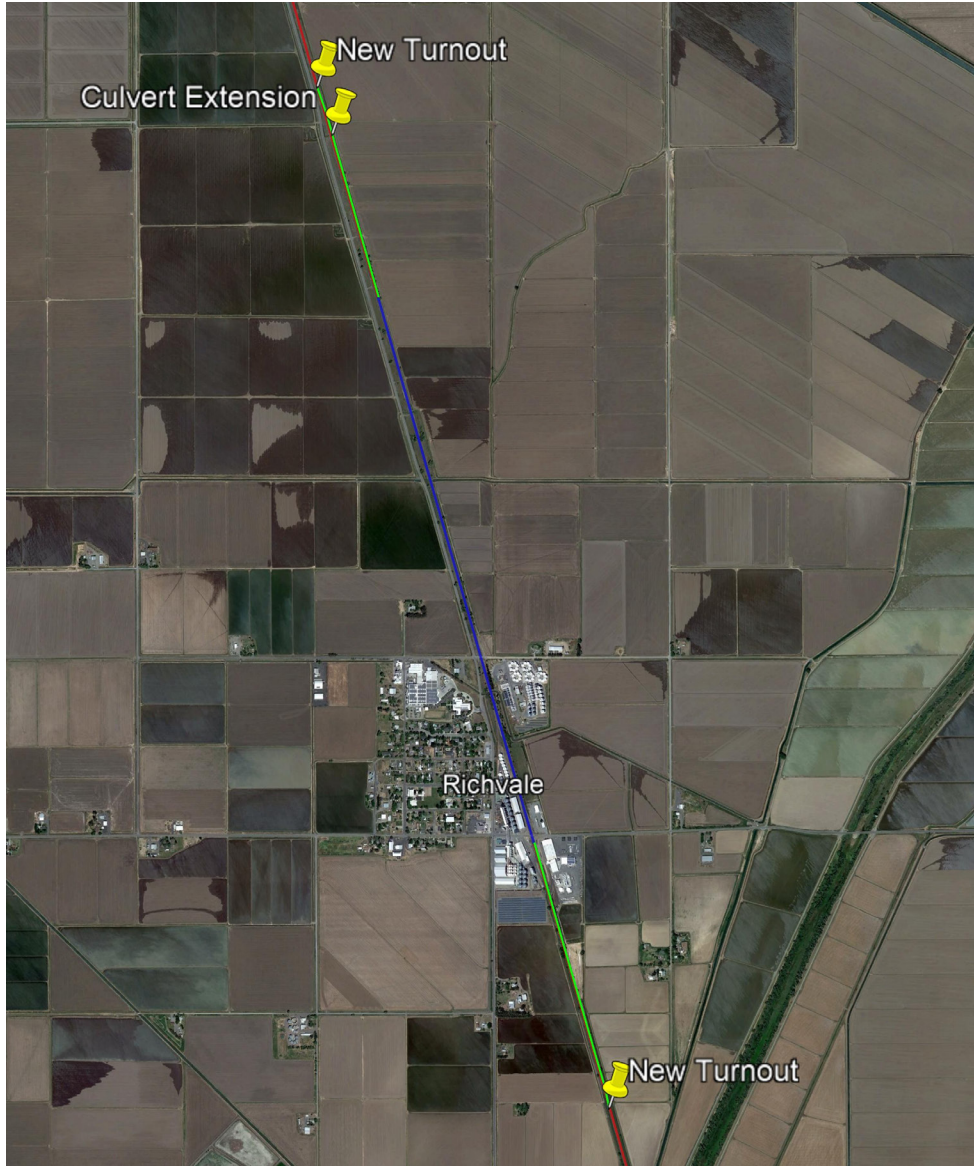
- **Existing**

- Siding Length - 1.6 Miles (MP154.1 to MP155.7)

- **Improvements**

- South Extension Length 2.1 Miles (MP155.7 to MP157.8)
- Upgrade Turnout at MP 154.1
- Final Siding Length 19,400'
- New Station at Gridley
 - Center Platform with Grade Separated Pedestrian Access
 - Parking to Support Station

Marysville to Chico – Richvale Siding Extension



- **Existing**

- Siding Length - 1.2 Miles (MP167.2 to MP 168.8)

- **Improvements**

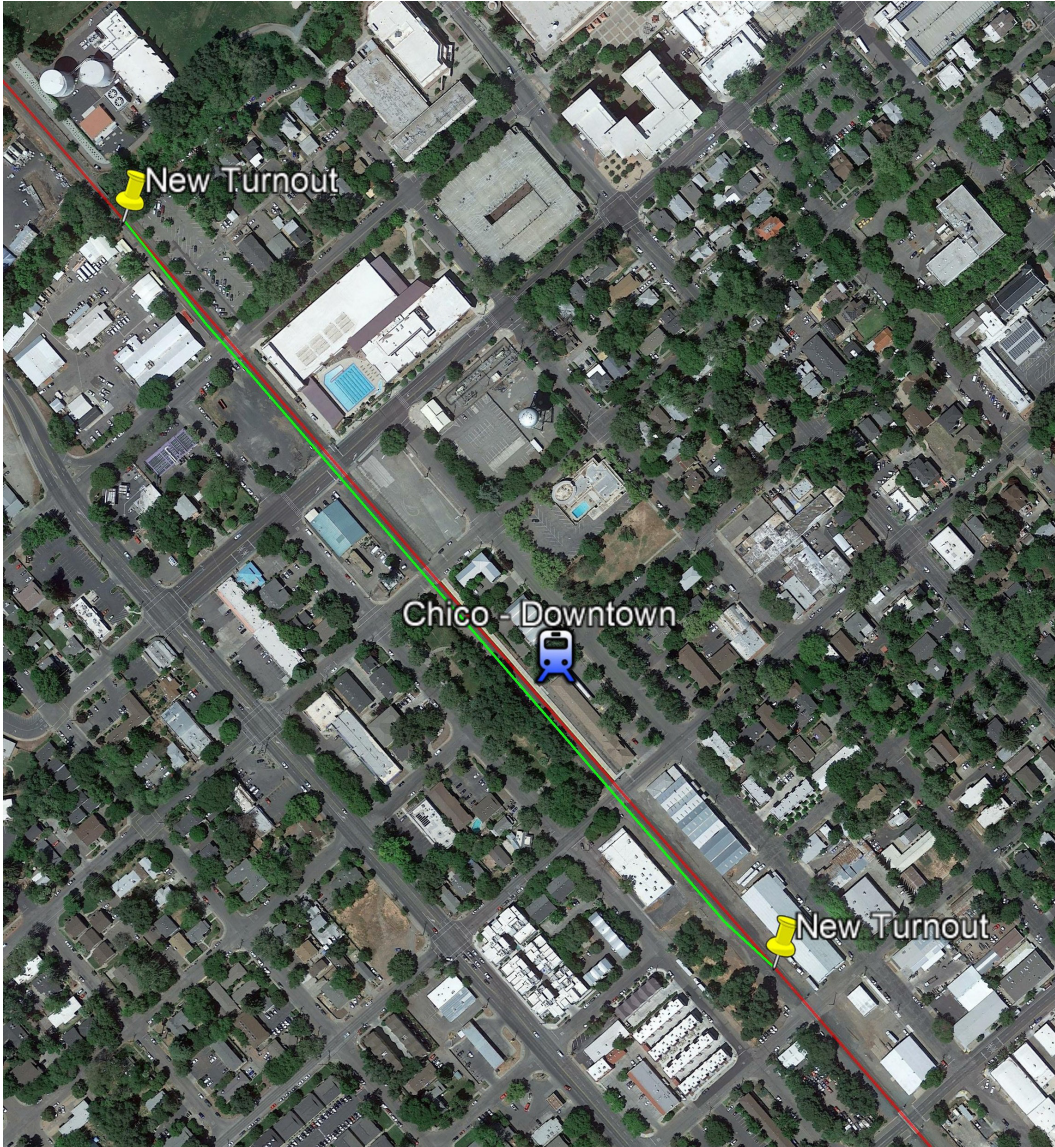
- South Extension Length 0.8 Miles (MP166.4 to MP167.2)
- North Extension Length 0.6 Miles (MP168.8 to MP169.4)
- One Culvert Extension
- Final Siding Length 15,000'

Marysville to Chico – New Durham Siding



- **Existing**
 - Single Track
- **Improvements**
 - Siding Length 2.9 Miles (MP176.5 to MP179.4)
 - Final Siding Length 15,000'

Marysville to Chico – Downtown Chico Station Option Siding



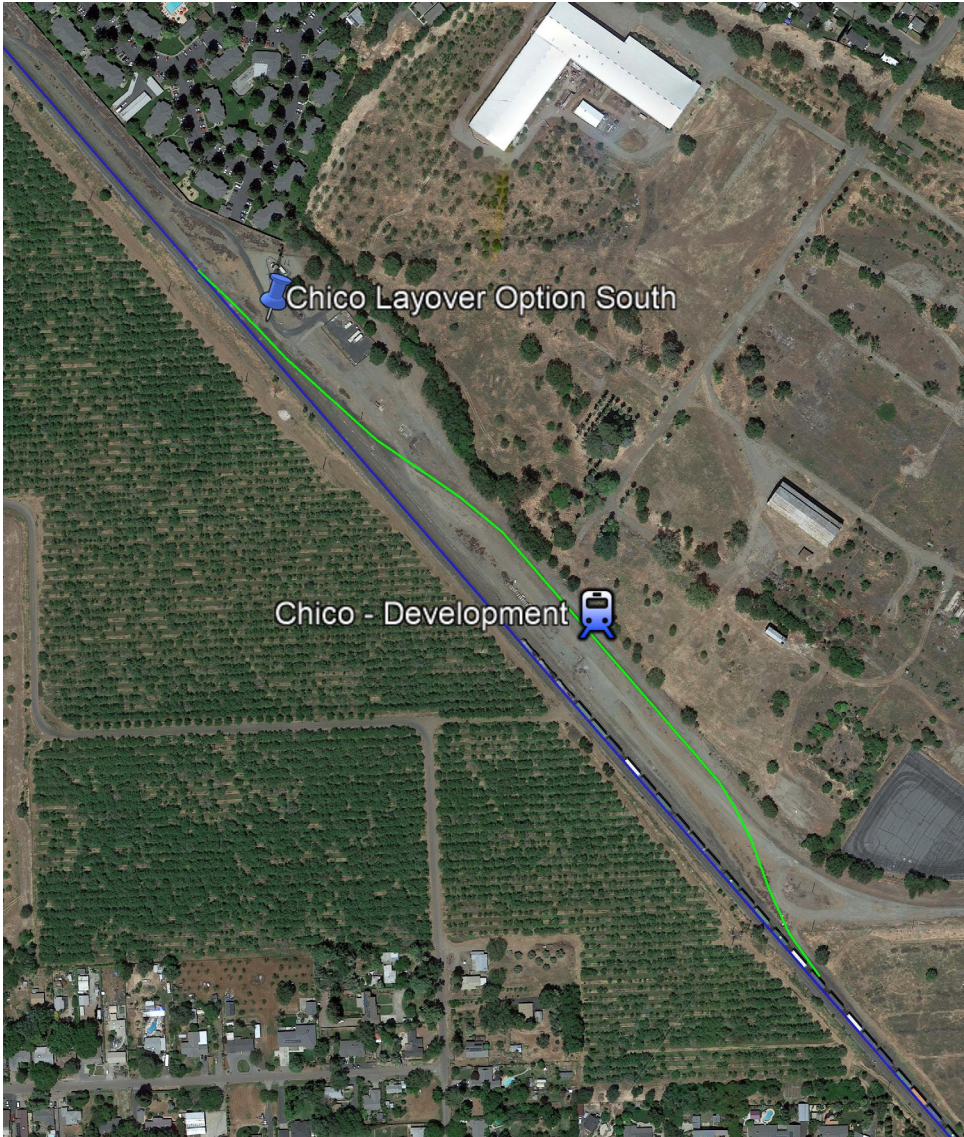
- **Existing**

- Single Track

- **Improvements**

- Station Bypass Track Length 0.4 Miles (MP184.0 to MP184.4)
- Final Siding Length 1,700'
- Side Platform
- Parking to Support Station

Marysville to Chico – Barber Yard Chico Station Option Siding



- **Existing**
 - Barber Yard
- **Improvements**
 - Combination of New and Upgraded Track
 - Siding Length 0.4 Miles (MP183.5 to MP183.0)
 - Final Siding Length 2,500'
 - Side Platform
 - Parking to Support Station



North Valley Passenger Rail Strategic Plan

CHICO • GRIDLEY • MARYSVILLE/YUBA CITY
PLUMAS LAKE • SACRAMENTO

Appendix C

Capital and Operations & Maintenance Cost Memorandum

Final Report

May 2024



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Project name:
North Valley Passenger Rail Strategic Plan

From:
Daniel Hartman
Daniel Krause
Anthony Mangonon

Date:
May 16, 2024

Memorandum

Subject: Capital and Operations & Maintenance Cost Memorandum

The Butte County Association of Governments (BCAG) is developing a strategic plan for new passenger rail service in the North Valley Region. This service is referred to as North Valley Rail. The ultimate goal of this effort is to develop a blueprint for integrating Butte County's major population centers with the state's larger rail network within the mid-term planning horizon (i.e., service start date of around 2031). This technical memorandum evaluates the capital costs associated with constructing the project.

Note: This memorandum will also be revised to include operation and maintenance (O&M) costs associated with running the service when that work is completed with San Joaquin Regional Rail Commission (SJRRC) and San Joaquin Joint Powers Authority (SJJPA).

Capital Costs

Introduction

The North Valley Rail Project (NVRP) includes an extension of passenger rail service from the currently planned terminus station in Natomas north to Chico. This route includes 34 miles on the UP Sacramento Subdivision and 42 miles on the UP Valley Subdivision. While the UP Valley Subdivision carries more freight than the UP Sacramento Subdivision, neither are as busy as the UP Fresno Subdivision. As such, it is anticipated the infrastructure improvements needed along the extension corridor would be similar to what they are asking for on the current Valley Rail Program for the UP Sacramento Subdivision in terms of new and extended sidings.

Infrastructure improvements specifically required for the passenger service would include stations, a layover facility and potentially additional sidings for passenger trains to pass each other. Caltrans worked with Deutsche Bahn Group to model the proposed North Valley Service in the Viriato Model tool, which verified that the proposed schedule had only one "meet" of trains coming from opposite directions at the Marysville-Yuba City Station. As such, no additional track infrastructure would be required to facilitate passenger train passing between Natomas and Chico. The model run was also helpful in identifying locations south of Natomas that will require passing trains for the Expanded Valley Rail Program, which envisioned 10 roundtrip passenger trains serving Natomas by around 2030 (an increase from 7 roundtrips serving Natomas in the original Valley Rail Program).

Station and Layover Improvements

Based on field reviews with BCAG, SJRRC/SJJPA and local jurisdictions, station locations were determined for four project stations to go along with the upgrades needed at the Natomas Station. New station siding track are required at 3 of the 4 new stations

The station list is below:

- Natomas Station Expansion
- Plumas Lake Station
- Marysville-Yuba City Station
- Gridley Station
- Chico Station

While each of the stations is unique, the main improvements at each station are consistent across the project. The stations include a passenger loading platform, passenger access facilities, station area parking, kiss and ride and transit opportunities like bus stops. Each station includes track improvements at the loading platform and for stations with a center loaded platform island, the passenger access facilities include a grade separation.

The NVRP will also require a location at the northern terminus in Chico for a layover facility to store trains. The layover facility includes train storage tracks, access roads along the tracks to perform cleaning, light maintenance and potential fueling. The facility will also include a modular building to support operations staff.

Track Improvements

In order to facilitate passenger rail operations on an existing freight rail corridor, there are improvements required in order to allow for train passing and to increase the overall capacity of the corridor to make up for the passenger trains taking up existing capacity. One option to building rail improvements along the project corridor is to provide Union Pacific Railroad (UPRR) with Capital Access Fees (CAF). UPRR can use these fees to implement capacity improvements throughout their system. The State prefers to incorporate CAFs where possible and UPRR has indicated an openness to consider them. Without CAFs, there will be a need to implement some track improvements within the project corridor. Given this, a list was developed of preliminary improvements was developed by AECOM for segments of track improvements in logical locations based on the service plan developed. However, any track improvements would need to be further analyzed in future rail network modeling to be conducted by UPRR. Therefore, the segments for potential track improvements listed below are preliminary and subject to change.

The potential segments of track improvements are listed below.

- Station Track at the expanded Natomas Station (0.3 miles)
- Pleasant Grove Siding Extension (1.7 miles)
- Mounkes Siding Extension tied to implementation of Plumas Lakes Station (2.4 miles)
- Marysville Siding Modifications (0.25 miles)
- Berg Siding Extension (1.3 miles)
- Fagan Siding Extension tied to implementation of Gridley Station (2.1 miles)
- Richvale Siding Extension (1.4 miles)
- New Durham Siding (2.9 miles)
- Chico Siding Extension (0.7 miles)

Infrastructure Improvements Costs Summary

Based on the list of preliminary improvements discussed above, preliminary cost estimates were developed using general costs identified below (2022\$):

- New Track @ \$15 M per mile

- New Station @ \$33.6 M each
- New Layover Facility @ \$30 M

Based on the above preliminary costs for each component, a range of costs was developed for each of the infrastructure components. Below is a summary breakdown of those costs:

Table 1. Station and Layover Project Costs

Item	Improvement Costs (\$2022)	Escalation Range	Total Range YOE (\$M)
Stations	\$151.2	\$48.0 – \$59.0	\$199.2 – \$210.2
Track at Stations	\$23.8	\$7.5 – \$9.3	\$31.3 – \$33.1
Layover	\$30.0	\$9.5 – \$11.7	\$39.5 – \$41.7
Total	\$205.0	\$65.0 - 80.0	\$270.0 - \$285.0

Table 2. Potential Track Improvement Project Costs

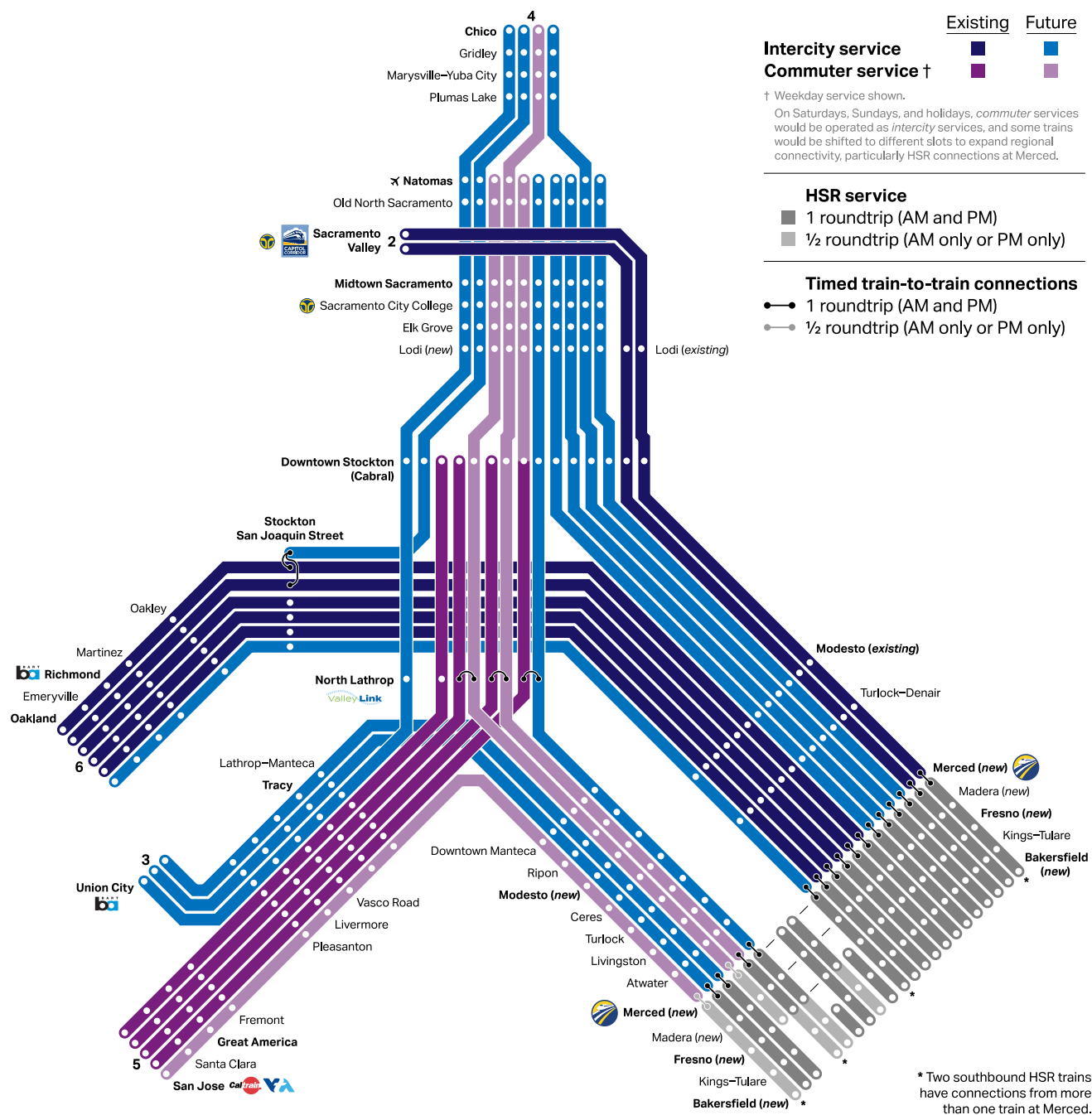
Item	Improvement Costs (\$2022)	Escalation Range	Total Range YOE (\$M)
Track Improvements*	\$177.0	\$53.0 – \$68.0	\$230.0-\$245.0

See **Attachment A** for additional details related to capital cost estimates for improvements at each location.

Operations & Maintenance Costs

The mid-term service plan illustrated in **Figure 1** shows daily service for North Valley Rail consisting of 3 intercity roundtrips and 1 commuter roundtrip. The commuter roundtrip and 2 of the intercity roundtrips—the one between Chico and Stockton San Joaquin Street and the one between Chico and Union City—would be operated as ACE trains, while the remaining intercity roundtrip would be operated as a *San Joaquins* train. The California State Transportation Agency (CalSTA) has requested that all existing and new passenger rail service employ cost reduction strategies for operations. For planning purposes, the current O&M cost model for the ACE service was used as a baseline to establish the O&M estimates for the expansion of service from Natomas to Chico. The methodology for estimating future O&M costs does not represent a detailed financial analysis of fixed and variable costs; however, an effort has been made to develop a preliminary evaluation of fixed and variable costs that are likely to increase as a result of the service expansion to Chico.

Figure 1. Expanded Valley Rail and North Valley Rail Mid-Term Service Plan



Source: AECOM

Existing ACE O&M Costs

SJRRC's 2023/2024 budget for the ACE service was used to determine the baseline O&M costs for ACE service, which included four round trips on weekdays between Stockton and San Jose. The ACE budget cited an O&M cost of \$45.5 million for the commuter rail operation generating 174,064 annual train-miles. The 2023/2024 budget is consistent with the updated Expanded Valley Rail Program O&M calculations. The figure included:

- \$5.0 million in the largely fixed costs for project management, services, and supplies;

- \$26.2 million in largely variable costs for contracted service and operations; and,
- \$1.8 million in shuttle services that ferry riders to and from the trains.
- \$3.2 million in capital access fees.
- \$1.8 million in capital maintenance fees.

Development of the ACE O&M Cost Model

In order to project O&M costs for the service expansion scenarios, specific modifications to the fixed and variable costs elements were made. For example, most fixed costs were increased by 24 percent to reflect an expanded operation. Variable costs related to train operations and bus shuttles were increased by the increase in train-miles¹. Assumptions were made with regard to new management personnel required to staff the expanded operation. Station maintenance costs were increased by the number of stations, and insurance costs were boosted in relation to ridership which reflect greater exposure to risk. Rail maintenance facility expenses were grown to account for the costs of maintaining more trainsets and to accommodate a new layover facility in Chico. In accordance with this approach, annual O&M costs that were developed for the proposed Merced Extension (from Lathrop), Sacramento Extension (from Stockton) and service to Union City were then updated to reflect the additional train service to Chico.

- **Existing Service-Levels (including 2023):** This scenario represents the existing service-levels, with the four trains (round trip) between Stockton and San Jose.
- **Future Baseline:** This scenario represents two extensions currently being implemented, with three trains (roundtrips) between Stockton and San Jose; one train (roundtrip) between Merced and San Jose; one train (roundtrip) between Natomas and San Jose; three trains (roundtrips) between Merced and Natomas (with a transfer to San Jose-bound trains at the North Lathrop Transfer Station); and one train (roundtrip) between Natomas and Stockton. This scenario also represents the service to Union City with one train (roundtrip) between Natomas and Union City; and two trains (roundtrips) between Merced and Union City.
- **Future with Project:** This scenario represents the Proposed Project operation, with three trains (roundtrips) between Stockton and San Jose; one train (roundtrip) between Merced and San Jose; one train (roundtrip) between Natomas and San Jose; two trains (roundtrips) between Merced and Natomas (with a transfer to San Jose-bound trains at the North Lathrop Transfer Station); one train (roundtrip) between Merced and Chico (with a transfer to San Jose-bound train at the North Lathrop Transfer Station); one train (roundtrip) between Chico and Stockton; one train (roundtrip) between Chico and Union City; two trains (roundtrips) between Merced and Union City; and one train (roundtrip) between Natomas and Chico, which represents the portion of the Proposed Project's *San Joaquins* roundtrip (Merced–Chico) that is specifically part of the Project and therefore included in the cost model.

Cost Findings

The current ACE four round trips between Stockton and San Jose on weekdays generated 174,064 annual train-miles and an annual O&M cost of \$38.1 million. In the table below, incremental and total train-miles and incremental and total O&M costs are identified for the Merced, Sacramento Extensions & Union City Service (Base) and the North Valley Rail Service (Project).

¹ A train-mile is generated by a train moving one mile. A train running 200 miles, for example, generates 200 train-miles.

Table 1: Train-Miles and O&M Cost Totals for ACE Service Expansions (\$-million)			
Metrics	Stockton – San Jose (Existing)	With Merced, Sacramento Extensions & Union City Service (Base)	With North Valley Rail Service (Proposed Project)
Pre-Extensions Train-Miles	174,064	174,064	174,064
Incremental Train-Miles for Base	0	688,400	688,400
Incremental Train-Miles for Proposed Project	0	0	149,416
Total Train-Miles	174,064	862,500	1,084,400
Pre-Extensions O&M Cost (\$- 2023)	\$38,093,656	\$38,093,656	\$38,093,656
Incremental O&M Cost for Base (\$-2023)	0	\$84,111,175	\$84,111,175
Incremental O&M Cost for Proposed Project (\$-2023)	0	0	\$24,004,541
Total O&M Cost (\$2023)	\$38,093,656	\$122,204,831	\$146,209,372

Note: The *San Joaquins* service south of Natomas is not included in the cost model, as this analysis is intended to capture only the incremental O&M costs associated with North Valley Rail by comparing the Future with Project scenario against the Future Baseline scenario. In that calculation for incremental (project) costs, the costs associated with the *San Joaquins* service south of Natomas would be zeroed out.

See **Attachment B** for additional details related to operations and maintenance cost estimates.

Attachment A - Preliminary Capital Cost Estimate

Project Specific Costs (2022\$):

New Track	\$15.0M per mile
Station	\$33.6M each
Layover	\$30.0M each

Station & Layover

Item	Description	Quantity	Unit	Unit Cost	Subtotal (\$M)
Stations	Natomas Station Expansion	0.5	each	\$33.6	\$16.8
Track Improvements	Natomas Station Expansion	0.3	miles	\$15.0	\$4.5
Stations	Plumas Lake Station	1	each	\$33.6	\$33.6
Stations	Marysville/Yuba City Station	1	each	\$33.6	\$33.6
Track Improvements	Marysville/Yuba City Station	0.25	miles	\$15.0	\$3.8
Stations	Gridley Station	1	each	\$33.6	\$33.6
Stations	Chico Station	1	each	\$33.6	\$33.6
Track Improvements	Chico Siding Extension	0.7	miles	\$15.0	\$10.5
Bridge	Chico Siding Extension	1	LS	\$1.0	\$1.0
At-Grade Crossings	Chico Siding Extension	1	LS	\$4.0	\$4.0
Layover	Chico	1	each	\$30.0	\$30.0
Total					\$205.0

Track Improvements

Item	Description	Quantity	Unit	Unit Cost	Subtotal (\$M)
Track Improvements	Pleasant Grove Siding Extension	1.7	miles	\$15.0	\$25.5
Track Improvements	Mounkes Siding Extension	2.4	miles	\$15.0	\$36.0
Track Improvements	Berg Siding Extension	1.3	miles	\$15.0	\$19.5
Track Improvements	Fagan Siding Extension	2.1	miles	\$15.0	\$31.5
Track Improvements	Richvale Siding Extension	1.4	miles	\$15.0	\$21.0
Track Improvements	New Durham Siding	2.9	miles	\$15.0	\$43.5
Total					\$177.0

Station & Layover Cost Summary Table with Escalation

Item	Improvement Costs (2022\$ M)	Escalation Range	Total Range YOE (\$M)
Station	\$151.2	\$48.0 - \$59.0	\$199.2 - \$210.2
Track at Station	\$23.8	\$7.5 - \$9.3	\$31.3 - \$33.1
Track at Station	\$30.0	\$9.5 - \$11.7	\$39.5 - \$41.7
Total	\$205.0	\$65.0 - \$80.0	\$270.0 - \$285.0

Track Improvement Cost Summary Table with Escalation

Item	Improvement Costs (2022\$ M)	Escalation Range	Total Range YOE (\$M)
Track Improvements	\$177.0	\$53.0 - \$68.0	\$230.0 - \$245.0
Total	\$177.0	\$53.0 - \$68.0	\$230.0 - \$245.0

Attachment B
North Valley Passenger Rail Strategic Plan
O&M Cost Estimates - (Base Year)

		ACE Operating Budget		
		Existing ¹ (FY23/24 Dollars)	Future Baseline ² (FY 23/24 Dollars)	Future with Project ³ (FY 23/24 Dollars)
Project Management, Services, and Supplies				
	Salaries/Benefits/Contract Help	\$4,327,168	\$4,327,168	\$4,327,168
	Additional Office Staff (Extension)	\$0	\$370,900	\$370,900
	Additional PSA Staff (Extension)	\$0	\$1,112,700	\$1,112,700
	Additional Ticket Agents (Extension)	\$0	\$370,900	\$370,900
	Office Expense Postage	\$21,154	\$25,808	\$26,231
	Subscriptions/Periodicals/Memberships	\$13,400	\$16,348	\$16,616
	Office Equipment/Furniture	\$27,700	\$33,794	\$34,348
	Computer Systems	\$2,000	\$2,440	\$2,480
	Communications	\$24,050	\$29,341	\$29,822
	Motor Pool	\$60,612	\$73,947	\$75,159
	Transportation/Travel	\$42,000	\$51,240	\$52,080
	Training	\$52,500	\$64,050	\$65,100
	Training—Security Grant Funded	\$0	\$0	\$0
	Audits Regulatory Reporting	\$61,085	\$74,524	\$75,745
	Professional Services Legislative	\$0	\$0	\$0
	Professional Services Legal	\$88,086	\$107,465	\$109,227
	Professional Services General	\$310,952	\$379,361	\$385,580
	Publications/Legal Notices	\$12,363	\$15,083	\$15,330
	Taxes Assessments	\$0	\$0	\$0
Project Management, Services, and Supplies Subtotal		\$5,043,070	\$7,055,069	\$7,069,387
Contracted Services				
	Maintenance of San Joaquin County Facilities	\$0	\$0	\$0
	Maintenance and Improve System Wide ACE Stations	\$42,420	\$143,168	\$143,168
	Maintenance of Headquarters Structures/Grounds	\$128,647	\$156,949	\$156,949
	ACE Operations & Maintenance	\$8,939,361	\$31,948,930	\$38,787,184
	Contracted Services*	\$0	\$0	\$0
	Positive Train Control	\$353,700	\$707,400	\$707,400
	Consumables/Repair Parts	\$1,500,000	\$7,432,215	\$9,344,615
	Operating Leases	\$88,695	\$108,208	\$108,208
	Fuel	\$2,700,000	\$13,377,986	\$16,820,306
	RR Maintenance, Oversight/Dispatching	\$3,166,267	\$15,688,251	\$19,725,030
	Insurance	\$4,655,466	\$8,627,506	\$8,902,506
	Insurance Management Fees	\$170,000	\$207,400	\$207,400
	Security Services/Safety Programs	\$591,471	\$2,113,894	\$2,566,346
	FRA/FTA Drug Testing Program	\$5,500	\$6,710	\$6,710
	Community Engagement & Marketing	\$920,292	\$1,122,756	\$1,122,756
	Special Trains	\$165,000	\$165,000	\$165,000
	Passenger Services	\$0	\$0	\$0
	Ticketing Services	\$530,331	\$1,895,382	\$2,301,064
	Professional Services Operations	\$328,433	\$1,173,807	\$1,425,045
	Communications, Operations	\$246,650	\$881,518	\$1,070,195
	Communications, Wi-Fi	\$406,000	\$2,011,653	\$2,529,276
	Emergency Ride Home Emergency Bus Bridges	\$60,000	\$297,289	\$373,785
	Rail Maintenance Facility	\$1,198,005	\$1,461,566	\$1,461,566
	Merced Layover (Extension)	\$0	\$600,000	\$600,000
	Chico Layover (Extension)	\$0	\$0	\$350,000
	Natomas Layover (Extension)	\$0	\$175,000	\$175,000
	Union City Layover (Extension)	\$0	\$350,000	\$350,000
Contracted Services Sub-Total		\$26,196,238	\$90,652,587	\$109,399,509
Shuttle Services		\$1,822,539	\$6,513,684	\$7,907,853

Capital Access Fees	\$3,242,516	\$11,588,627	\$14,069,022
Capital Maintenance Fees	\$1,789,293	\$6,394,864	\$7,763,602
TOTAL OPERATING EXPENSES	\$38,093,656	\$122,204,831	\$146,209,372

- ¹ Existing: This scenario represents the existing service-levels, with the four trains (round trip) between Stockton and San Jose.
- ² Future Baseline: This scenario represents two extensions currently being implemented, with three trains (round trip) between Stockton and San Jose; one train (round trip) between Merced and San Jose; one train (round trip) between Natomas and San Jose (round trip); three trains (round trip) between Merced and Natomas (with a transfer to San Jose-bound trains at the North Lathrop Transfer Station); and one train (round trip) between Natomas and Stockton. This scenario also represents the service to Union City with one train (round trip) between Natomas and Union City; and two trains (round trip) between Merced and Union City.
- ³ Future with Project: This scenario represents the Proposed Project operation, with three trains (round trip) between Stockton and San Jose; one train (round trip) between Merced and San Jose; one train (round trip) between Natomas and San Jose (round trip); two trains (round trips) between Merced and Natomas (with a transfer to San Jose-bound trains at the North Lathrop Transfer Station); one train (round trip) between Merced and Chico (with a transfer to San Jose-bound train at the North Lathrop Transfer Station); one train (round trip) between Chico and Stockton; one train (round trip) between Chico and Union City; two trains (round trip) between Merced and Union City; and one train (roundtrip) between Natomas and Chico, which represents the portion of the Proposed Project's *San Joaquins* roundtrip (Merced–Chico) that is specifically part of the Project and therefore included in the cost model.



North Valley Passenger Rail Strategic Plan

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Appendix D Ridership and Revenue Forecasts and Train Capacity Analysis Memorandum

Final Report

May 2024



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Project name:
North Valley Passenger Rail Strategic
Plan

From:
Daniel Krause
Anthony Mangonon

CC:
Jon Clark, BCAG
Dan Leavitt, SJRRC/SJJPA

Date:
May 16, 2024

FINAL

Memo

Subject: Deliverable 3.7.1 (Ridership and Revenue Forecasts and Train Capacity Analysis)

The Butte County Association of Governments (BCAG) is developing the North Valley Passenger Rail Strategic Plan (Strategic Plan), which is a planning-level study for the development of a new passenger rail service in the North Valley Region. The overall project is now referred to as the “North Valley Rail Project” (NVRP). The ultimate goal of the Strategic Plan is to develop a blueprint for integrating the North Valley Region with the state’s larger rail network within the Mid-Term Planning Horizon (i.e., service start date of around 2030). As part of this Strategic Plan, a detailed ridership analysis was conducted and is the topic of this memorandum.

Executive Summary

Ridership forecasting for the Strategic Plan was conducted concurrently with the Southern Alameda County Integrated Rail Analysis (“SoCo Rail Study”) and with service planning related to the expanded Valley Rail Program connecting with high-speed rail in Merced. Additional updates to model inputs and assumptions were made after completion of the forecasts for the SoCo Rail Study. Forecasts were developed by combining and synthesizing results from the ACE Passenger Rail Forecasting Model (which has been used for a variety of service planning efforts for ACE and the *San Joaquins*) and the Alameda County Transportation Commission travel demand forecasting model (to provide more precise ridership distribution and assignment for the planned ACE extension to Union City).

A baseline model was calibrated to observed 2019 ridership for ACE and the *San Joaquins*. The baseline model was then modified to represent scenarios in 2030 with and without North Valley Rail, and ridership and revenue forecasts were generated for each scenario.

The modeled service plan reflects 4 daily roundtrips extending north of Natomas, with stops at the four planned stations at Plumas Lake, Marysville–Yuba City, Gridley, and Chico. Prior to North Valley Rail, these trains are still planned for operation, but they would start or end at Natomas and would not extend north beyond Natomas. The conceptual timetable is designed to provide regional and intercity connections (e.g., timed transfers with high-speed rail in Merced), but 2 of the 4 daily roundtrips are also in slots that coincide with the commuter market from the North Valley into Sacramento. The modeled service plan also includes several corresponding changes to Thruway Bus service in conjunction with the extension of rail service.

Overall, North Valley Rail would increase annual ridership across the combined ACE and *San Joaquins* system in 2030 by 476,200 passengers (to a total of 5,812,600 passengers). Daily ridership across the system would increase by 1,305 passengers as a result of North Valley Rail. Annual ridership (in 2030) at the four new North Valley Rail stations would be approximately 166,900 for Chico, 61,400 for Gridley (including passengers making connections to/from Oroville), 166,000 for Marysville–Yuba City, and 83,800 for Plumas Lake.

In terms of geographical markets for North Valley passengers, the largest ridership flows (in terms of annual passengers) are between the North Valley and the Sacramento Area (357,600 passengers); connecting HSR trips (38,700 passengers); and between the North Valley and the Central San Joaquin Valley (25,500 passengers).

A link load analysis was also conducted for the North Valley Rail trains to determine if shorter trainset lengths can be assumed when designing platforms at the planned stations. The results show that both a Bombardier BiLevel trainset with 8 passenger coaches (with platform lengths ranging from 705 feet to 810 feet, depending on specific considerations at each station) and a 3-unit Stadler FLIRT trainset would be sufficient for North Valley Rail stations.

Purpose of this Memorandum

This technical memorandum describes the process and methodology of developing the ridership and revenue forecasts, including key assumptions, and inputs such as demographic data and conceptual operating plans, to support a proposed extension of Valley Rail Trains from the planned Natomas/Sacramento Airport Station to a north terminal station in Butte County located in Chico, CA. This memo also summarizes the results of these forecasts. Additionally, a train capacity analysis is provided that assesses forecasted ridership relative to the train capacity of several types of trainsets.

The memorandum is divided into the following main sections:

- General Methodology
- Base-Year Ridership and Validation
- Demographic Assumptions
- Scenarios and Forecasts
- Train Capacity Analysis

General Methodology

Ridership forecasting for the Strategic Plan was conducted concurrently with ridership forecasting for the following two planning efforts:

- Southern Alameda County Integrated Rail Analysis (“SoCo Rail Study”), a planning-level study led by the Metropolitan Transportation Commission (MTC) to support a proposed extension of Altamont Corridor Express (ACE) service to a second Bay Area terminus at the Union City Intermodal Station, where ACE would connect with the BART system, Dumbarton Corridor buses to/from the Peninsula, and other local transit services.
- Service planning related to the expanded Valley Rail Program providing connectivity to the California High-Speed Rail system’s Early Operating Segment (EOS) between Merced and Bakersfield.

The ridership forecasts were developed by combining and synthesizing results from two independent models: (1) the AECOM-created ACE Passenger Rail Forecasting Model (“ACE Model”), and (2) the Alameda County

Transportation Commission (ACTC) travel demand forecasting model (“ACTC Model”). This joint-model approach allows the ridership forecasting effort to take advantage of each individual model’s strengths.

The ACE Model is focused on ACE, *San Joaquins*, and passenger rail in general, and encompasses a larger, megaregional and interregional geography for the expanded ACE and Amtrak *San Joaquins* systems that is well beyond the geographic extent of any of the individual urban travel demand models used by the MTC, the San Joaquin Council of Governments (SJCOG), or other applicable metropolitan planning organizations (MPOs). On the other hand, the ACTC Model provides finer modeling detail for the SoCo Rail Study at the (future) Union City end of the system, including network assignment procedures to allow for better reporting of transfers within the Bay Area.

The two individual models (ACE Model and ACTC Model) and the joint-modeling approach are described in more detail in the following subsections.

ACE Model

AECOM developed and has used the ACE Model to forecast ridership for recent and ongoing plans and projects to implement service improvements to and extensions of the ACE and Amtrak *San Joaquins* services as part of the Valley Rail Program (including ACE extensions to Sacramento and Merced). The ACE Model has also been used to support ridership forecasting efforts for the Valley Link project.

The ACE Model considers both intercity and commuter passengers and is based on a ridership forecasting model for Amtrak called the National Intercity Model, also developed by AECOM. The ACE Model was calibrated to match existing ACE and *San Joaquins* ridership and updated to account for future short- and long-term investments in the passenger rail network in Northern California, including select connections with BART.

The ACE Model is an incremental model designed to produce ridership forecasts for mainline passenger rail services. The model pivots off of observed ridership and service by station pair to capture the ridership impacts of making incremental changes to service. Forecasts are based on demographic growth around stations and service characteristics (such as train frequency, travel times, and the time of day that trains operate). In cases where there is no existing service, a new station is assigned a “proxy” station that has similar characteristics (e.g., station area population and employment levels) to the new station, and the base ridership is adjusted to account for differences in market size and service. Each train is modeled separately, which allows for time-of-day factoring for both departure and arrival times. Connections are explicitly modeled and factored down to reflect the lower appeal of a required transfer. The model produces ridership forecasts that are unconstrained with regards to train capacity and parking capacity.

The three primary inputs to the ACE Model—base-year ridership, demographics, and service plan—are discussed in more detail later in this memorandum.

Model Outputs

In addition to the primary output (ridership), the ACE Model also produces several secondary outputs that are derived directly from the ridership, including revenue and avoided vehicle miles traveled (VMT).

Revenue

Fares do not affect ridership numbers directly in the ACE Model, and revenue is calculated based on the ridership forecasts. Unmodeled attributes such as fares are therefore indirectly included in the incremental model through the calibrated baseline ridership, in that it is assumed that the proposed fares will be the same or similar to the existing fares. In cases where there is no existing ridership, such as for extensions, new stations are assigned a proxy station that has similar characteristics (including market size and service levels) to the new station.

The revenue is calculated as the forecasted ridership for each station pair multiplied by the existing average fare for each station pair. For new station pairs, fares are interpolated based on existing fares.

Avoided Vehicle Miles Traveled

As automobile travel is not included in the ACE Model, avoided VMT is estimated by taking passenger miles traveled (PMT)—i.e., train miles by station pair multiplied by ridership—and adjusting PMT downward using a factor that represents average vehicle occupancy (AVO) for personal vehicle travel and other effects described below.

In terms of AVO assumptions for intercity transportation, an AVO of 1.2 has been used by the California High-Speed Rail Authority (CHSRA) and the Early Train Operator (ETO) for estimating VMT reductions and associated greenhouse gas (GHG) reductions for the HSR EOS.⁽¹⁾ AVO rates for commuter-focused projects (such as commuter rail and freeway improvements), on the other hand, are generally lower than for intercity rail projects, reflecting a higher propensity for single-occupant vehicles (SOVs) for commute travel due to shorter trip distances, employment requirements (e.g., unusual shift times, work vehicle requirements), and other considerations. The San Joaquin Council of Governments (SJCOC), for example, has applied AVO rates as low as 1.10 and 1.15 for the Valley Link rail project and for various freeway improvement projects along Interstate 580 (including the segment through the Altamont Pass), Interstate 205, State Route 99, and State Route 120 within San Joaquin County.⁽²⁾ ACTC estimated similar but slightly higher AVO rates, ranging from 1.16 to 1.22, for Interstate 580 within the Tri-Valley based on 2018 data.⁽³⁾

Given the potential variability in AVO across geographies and trip types/purposes, the ACE Model simplifies the VMT estimation process by assuming a conservative factor of 1.375 for AVO. This value was originally an AVO estimate derived from data collected in a Caltrans survey of drivers using westbound I-580 over the Altamont Pass, conducted on a Thursday in September 2005. The value was derived from responses to a question relating to group size, which was then extrapolated to average daily traffic.

More recent sources, however, have assumed or estimated substantially lower values for AVO, including the ACTC estimates (ranging from 1.16 to 1.22) developed in 2018. This trend may be a reflection of differences in geography or location (Altamont Pass vs. Tri-Valley) and margins of error in the 2005 survey methodology, as well as the general decrease in carpooling over the last several decades. Beyond the general decline in carpooling, the ACTC also specifically noted that AVO rates along I-580 decreased with implementation of express lanes within the Tri-Valley portion of the corridor.⁽⁴⁾

Despite these differences, the ACE Model has conservatively retained use of the much higher AVO estimate of 1.375 derived from the 2005 Caltrans survey data, which results in a lower estimate of avoided VMT when compared to alternative AVO values that are lower. It also aligns better with higher expected AVO rates for intercity travel (compared to commute travel), recognizing that the majority of the proposed North Valley Rail service and much of the larger future service plan for the combined ACE and *San Joaquins* system are specifically designed to capture intercity travel (as discussed in more detail later in the “Scenarios and Forecasts” section of this memorandum). Use of 1.375 instead of lower values also allows the AVO estimate to account both for the AVO rate and for other effects on PMT that would not reduce VMT, such as induced demand, changes in train or station choice among existing riders, and mode shifts from non-automobile modes.

Induced demand, for example, represents new trips induced specifically by the project and would not represent a VMT reduction benefit of the project. This also holds for existing riders who switch trains (i.e., take a train at a different time) or shift from another non-automobile mode (e.g., local transit or intercity bus) as a result of the project. In all of these cases, the project would not generate a VMT reduction benefit. In the case of riders who

(1) *California High-Speed Rail Early Train Operator Side-by-Side Study Quantitative Report* (February 8, 2020), available at https://hsr.ca.gov/wp-content/uploads/docs/about/business_plans/2020_Business_Plan_Side_by_Side_Study_Quantitative_Report.pdf.

(2) *Congested Corridors Plan* (March 2020), available at <https://www.sjcog.org/DocumentCenter/View/5121/SJCOC-Congested-Corridor-Plan-Report-final?bidId=>.

(3) *I-580 Express Lanes After Study: Report to the California State Legislature* (October 25, 2018), available at https://www.alamedactc.org/wp-content/uploads/2018/11/580_Express_Lanes_After_Study_FINAL-1.pdf.

(4) *Ibid.*

shift stations, there may be some (typically minor) VMT reduction benefit, such as from a passenger living in Plumas Lake who originally drives to Natomas to board the train but now takes the train directly from Plumas Lake.

When holding PMT constant, use of an AVO of 1.375 instead of 1.20 (as suggested based on the general upper bound of AVO rates from the various sources cited above) results in an avoided VMT estimate that is approximately 13 percent lower, which reasonably accounts for induced demand and the other effects described above. Compared to a lower baseline AVO of 1.15 for commute travel (which would align with some of the commuter service and commuter-focused markets within the larger Valley Rail Program), the difference increases to 16 percent. For example, the proposed service for North Valley Rail includes two roundtrips in slots that would be well-positioned to capture North Valley commuters working in the Sacramento area. Thus, use of the higher AVO of 1.375 can also be considered somewhat conservative in this context.

It should also be noted that the actual (i.e., net) benefit of the project with respect to VMT reductions is calculated by taking the *incremental* change in the avoided VMT (i.e., from No Build to Build). The No Build and Build scenarios for the project are described in more detail in the “Scenarios and Forecasts” section of this memorandum.

ACTC Model

The ACTC Model is the countywide transportation planning model for use within Alameda County and is maintained and updated by ACTC in consultation with MTC, Alameda County, and local jurisdictions within the County. Like the other countywide models in use within the nine-county San Francisco Bay Area, the ACTC Model is consistent with the regional travel demand forecasting models maintained by MTC, as well as the land use and socio-economic database maintained by the Association of Bay Area Governments (ABAG).

The ACTC Model is a typical four-step model and includes an iterative feedback loop to ensure that travel choices are predicted based on congested travel conditions. After traffic is assigned to the road network, congested travel times are calculated based on traffic congestion, and these congested times are brought back to the mode choice step which considers the attractiveness of auto versus transit for each trip. The loop is repeated to ensure stable results.

In support of the BART to Livermore Extension Draft Environmental Impact Report (“BLVX DEIR”), a modified version of the ACTC Model was developed, with refinements to improve model validation for travel between the Tri-Valley and San Joaquin County and the rest of the San Francisco Bay Area. This version of the ACTC Model was then used to forecast traffic volumes and transit ridership in the Tri-Valley area for the BLVX DEIR. The model demographics were updated to include the demographics from Plan Bay Area 2040 and SJCOG’s 2018 Regional Transportation Plan (RTP), as discussed in more detail in the “Demographic Assumptions” section of this memorandum.

The ACTC Model includes a network representation of local transit services within Alameda County, as well as key regional transit services that connect Alameda County with the larger Bay Area. Transit services represented in the ACTC Model include BART, Amtrak, Caltrain, Muni Metro, Santa Clara Valley Transportation Authority (“VTA”), Sonoma–Marin Area Rail Transit (SMART), AC Transit, Union City Transit, the San Joaquin Regional Transit District (“RTD”) (bus service to/from BART’s Dublin/Pleasanton Station), and ferry services. In particular, the ACTC Model represents BART service and the interaction between BART and other services well. The ACTC Model therefore serves as a good tool to understand the interaction between urban transit services, a key consideration for both the SoCo Rail Study (which focuses specifically on the ACE extension to Union City) and the North Valley Passenger Rail Strategic Plan (which includes direct service to/from the new Union City station, as discussed in more detail later in this memorandum).

The ACTC Model covers Alameda County, the other eight counties of the nine-county Bay Area, and San Joaquin County. However, the network is not very detailed in San Joaquin County and the zones are coarser. Planned ACE extensions and other transit services beyond San Joaquin County are not represented in the ACTC Model.

Joint ACTC–ACE Model

As mentioned above, the ACTC Model is a good tool to understand the interaction between BART and other transit services within the Bay Area, as well as the influence of traffic congestion within San Joaquin County. In contrast, the ACE Model does a good job representing ACE service and mainline passenger rail, especially beyond San Joaquin County. Therefore, for this combined ridership forecasting effort for the North Valley Passenger Rail Strategic Plan, SoCo Rail Study, and expanded Valley Rail Program, AECOM developed a joint model based on the ACE Model and the “BLVX” version of the ACTC Model. Outputs from the ACE Model were combined with the ACTC Model to take advantage of the ACTC Model’s network assignment procedures, enabling better reporting of transfers and other ridership statistics.

The first step in this process was to run the ACE Model to forecast ridership outside the geographic area of the ACTC Model. For this step, station-to-station trip tables were produced for the ACE network, including the new North Valley and Union City train services.

Next, the base year ACTC Model was run. The proposed ACE service (described in more detail in the “Scenarios and Forecasts” section of this memorandum) was inputted into the model as an additional ACE line with the service truncated to the portions of the proposed routes within the Bay Area counties (Alameda County and Santa Clara County) and San Joaquin County, as the ACTC Model’s coverage does not extend beyond San Joaquin County. Like other transit services in the ACTC Model, the ACE extension to Union City was coded with the proposed stops, running times, and headways, in the standard model input format. Unlike the detailed train-level timetable in the ACE Model, the ACTC Model utilizes a headway representation of transit service.

The resulting station boardings were then compared to boardings from the ACE Model. The proposed ACE extension to Union City provides a connection to the Union City Intermodal Station, which opens up convenient access to BART for markets along the ACE network. As mentioned previously, however, the ACTC Model does not adequately represent demand beyond San Joaquin County. Therefore, station-to-station forecasts from the ACE Model were added to the ACTC Model. Station-to-station trips from the ACE Model were allocated to specific origins and destinations, approximated using a contiguous series of TAZs covering the geographic extent of the modeling effort in the ACTC Model. The results were then checked to avoid double-counting trips forecasted in the ACTC Model, creating a combined set of transit trip tables to assign to the ACTC Model networks for generating estimates of boardings and alightings at the Union City station.

As described above, the integration of the ACE Model and the ACTC Model helps to understand and provide better distribution of ACE trips into the Alameda County area using the detailed transit network and transit assignment procedures in the ACTC Model. This joint-model approach also allows some effects, such as roadway congestion, to be partly accounted for explicitly within the Bay Area portion of the ACE system. Congestion between Union City and the Tri-Valley and San Joaquin County, for example, is inherently captured by the ACTC Model when estimating ridership at Union City.

Combining the ACTC Model with the ACE Model also recognizes that the ACTC Model does not capture detailed effects outside of the nine-county Bay Area and San Joaquin County. In fact, most urban travel demand models are designed specifically for use at the city, county, or metropolitan/urbanized area level, and are not designed to produce forecasts or simulate effects at the megaregional scale of the combined ACE and *San Joaquins* system.

Base-Year Ridership and Validation

As described previously, the ACE Model is primarily driven by base-year ridership, demographics, and service characteristics. This section describes the process of developing and validating the base-year ridership for the ACE Model.

As the ACTC Model is maintained separately by ACTC, no validation is necessary for the ACTC Model. There were no changes to the ACTC Model’s structure, constants, factors, or other elements as part of this combined

forecasting effort for the North Valley Passenger Rail Strategic Plan, SoCo Rail Study, and expanded Valley Rail Program, other than to update the demographic inputs to reflect the latest available data at the time the model was being set-up. The process of updating demographic assumptions for both the ACE Model and the ACTC Model are discussed in subsequent sections later in this memorandum.

National Intercity Model

The ACE Model was originally based on the National Intercity Model developed by AECOM to support proposed changes and service improvements in both long- and short-distance rail corridors throughout the United States, including state-supported corridors. This model has been used for a variety of purposes, including by Amtrak and its state partners to plan and budget for intercity passenger rail services:

- Business planning
 - Amtrak: Annual budget development
 - California Department of Transportation (Caltrans): Yearly Corridor Business Plans
 - Caltrans: California State Rail Plan (10-year horizon)
- Service planning
 - Evaluation of service options on existing routes:
 - Travel times
 - Stopping patterns
 - Frequency
 - Evaluation of service options on new routes
 - New corridors/markets
 - Extensions of existing corridors

ACE Model Genesis and Calibration

The ACE Model was developed to support the ridership forecasting efforts for ACE, including the existing commuter rail service and future commuter and intercity rail expansions within the Central Valley, the Altamont Corridor, and elsewhere. Drawing from the Model's original roots in the National Intercity Model, the ACE Model has been upgraded and expanded to include the *San Joaquins* intercity rail service, which shares much of its service area in the Central Valley with the existing ACE service and future planned ACE expansions.

One of the most significant early applications of the ACE Model was for the *ACEforward* program, composed of an expansive series of service changes for ACE that included travel time reduction, additional roundtrips, extensions into new corridors, new stations on the existing ACE route, new weekend service, potential HSR connections in Merced, and potential BART connections in the Tri-Valley or at Union City.

As part of the development process for *ACEforward*, the ACE Model was calibrated to ACE ridership in Fiscal Year (FY) 2013, using observed daily ridership reports logged by the contract operator (Herzog Transit Services) for four days in 2013 (July 9, August 13, September 17, and November 19). **Table 1** summarizes average station ons and offs and segment volumes for the selected dates in 2013.

Table 1. Average Daily Ridership by Station and Segment (2013)

Station	Westbound (AM)			Eastbound (PM)			Daily
	Ons	Offs	Segment volume (departing)	Ons	Offs	Segment volume (arriving)	Segment volume
Downtown Stockton	283	—	283	—	266	266	549
Lathrop–Manteca	551	0	834	0	538	804	1,638
Tracy	612	3	1,443	2	574	1,376	2,819
Vasco Road	172	76	1,539	47	157	1,486	3,025
Livermore	194	77	1,656	52	177	1,611	3,267
Pleasanton	424	300	1,780	317	425	1,719	3,499
Fremont	122	235	1,667	278	173	1,614	3,281
Great America	0	1,254	413	1,209	0	405	818
Santa Clara	0	80	333	84	0	321	654
San Jose	—	333	—	321	—	—	—
Total	2,358	2,358	2,358	2,310	2,310	2,310	4,668

Source: AECOM, 2023

Note:

Average daily ridership across a sample of four selected dates in 2013: July 9, August 13, September 17, and November 19. The term “daily” connotes “daily reports” that were run on the dates identified as opposed to “daily service”. At the time, ACE only operated on weekdays and therefore was not a daily service, but rather a weekday service. ACE briefly ran a pilot Saturday service and occasional event-day service for Levi’s Stadium, but otherwise has been a weekday-only service throughout its history.

To derive trip tables by train and station pair, an iterative factoring process was applied to the observed boardings (ons) and alightings (offs) for each train in both the inbound (westbound) and outbound (eastbound) directions (from **Table 1**). This iterative process factors the observed data, proportionally, to obtain the trips for each station pair by matching the total ons and offs for each station respectively. The forecasted ridership and passenger miles from the ACE Model were then adjusted to match the actual FY2013 values of 1,019,700 and 45,159,600, respectively.

Table 2 summarizes the estimated average daily ridership by station pair based on the observed data from the four selected dates in 2013.

Table 2. Estimated Average Daily Ridership by Station Pair (2013)

Origin ↓	← Destination →										Total
	SKT	LTM	TRC	VAS	LIV	PLS	FMT	GAC	SCC	SJC	
SKT	—	0	1	15	13	46	28	135	9	36	283
LTM	0	—	2	27	24	87	55	269	16	71	551
TRC	0	2	—	34	31	100	58	293	19	77	614
VAS	10	18	19	—	9	30	17	87	5	24	219
LIV	9	19	19	5	—	37	22	102	6	27	246
PLS	50	100	107	28	32	—	55	276	19	74	741
FMT	32	67	71	20	23	65	—	92	6	24	400
GAC	122	249	267	77	92	270	132	—	0	0	1,209
SCC	9	17	19	6	7	18	8	0	—	0	84
SJC	34	66	72	21	23	72	33	0	0	—	321
Total	266	538	577	233	254	725	408	1,254	80	333	4,668

Source: AECOM, 2023

Note:

Average daily ridership across a sample of four selected dates in 2013: July 9, August 13, September 17, and November 19.

Since that version of the ACE Model, incremental improvements and changes to the model have been incorporated throughout the past several years to support various ridership forecasting efforts for ACE and Amtrak *San Joaquins* services. For this combined forecasting effort for the North Valley Passenger Rail Strategic Plan, SoCo Rail Study, and expanded Valley Rail Program, an extensive restructuring and base-year update (to 2019) was completed in 2023, but the underlying ACE Model has not changed. The ACE Model was recalibrated again in early 2024 to improve the baseline model's prediction of 2019 rail trip volumes and travel patterns. To re-calibrate the ACE Model to a 2019 base year, ACE trips by station pair from the 2013 base-year model were escalated according to growth factors calculated using actual ACE ridership performance in 2013 and 2019, with additional adjustments applied to match actual ridership performance at each station in 2019. A 2019 *San Joaquins* station-to-station trip table was developed based on *San Joaquins* ridership data provided by the San Joaquin Joint Powers Authority (SJJPJA) and used as input to the ACE Model.

For reference, **Table 3** summarizes observed ridership and passenger miles against corresponding base-year forecasts from the current version (2019 base year) and most recent previous version (2018 base year) of the ACE Model. As shown in **Table 3**, the current base-year ridership forecast for 2019 is approximately 0.5 percent lower for both ACE and the *San Joaquins* than the corresponding actual 2019 ridership and is therefore within a reasonable expected range. This conclusion also holds for 2018, where the model's ridership forecasts are approximately four percent lower for ACE and two percent lower for the *San Joaquins* compared to the actual ridership. Since its development for the *ACEforward* program, the ACE Model has been used to support ridership forecasting for a wide variety of projects for ACE and the *San Joaquins*, and its results have been thoroughly reviewed as part of each of these efforts, providing further confidence in the model's overall accuracy and reasonableness.

Table 3. Observed vs. Modeled Ridership – System-Level Comparison

ACE					San Joaquins		
Calendar Year	Observed		Modeled		Calendar Year	Observed	Modeled
	Annual ridership	Annual passenger miles	Annual ridership	Annual passenger miles		Annual ridership (a)	Annual ridership
2013	940,774	42,140,286	—	—	2013	1,195,898	—
2014	1,075,648	48,424,520	—	—	2014	1,202,624	—
2015	1,209,755	52,241,764	—	—	2015	1,181,639	—
2016	1,290,085	55,471,664	—	—	2016	1,135,424	—
2017/	1,299,717	55,703,220	—	—	2017	1,125,626	—
2018	1,398,954	61,400,684	1,451,800	65,195,800	2018	1,090,200	1,070,000
2019	1,506,183	65,810,476	1,498,200	64,945,900	2019	1,076,454	1,070,600
2020	1,061,990	46,419,957	—	—	2020	794,634	—
2021	160,007	8,891,727	—	—	2021	392,538	—
					2022	656,469	—

Source: AECOM, 2024

Note:

(a) Actual ridership for the San Joaquins represents the corresponding State fiscal year (July–June) that includes the six months preceding the calendar year and the first half of the calendar year. For example, the actual ridership for FY 2012–13 (i.e., July 2012–June 2013) is reported here under the calendar year for 2013.

Table 4 compares observed and modeled ridership for ACE at the station level. As shown in **Table 4**, the current version of the ACE Model was calibrated to reproduce 2019 ACE station-level ridership, falling within about 0.5 percent of observed ridership for each station.

Table 4. Observed vs. Modeled Ridership – Station-Level Comparison (ACE)

Station	Annual ridership (2019)		Difference	
	Observed	Modeled	Absolute	Percent
Downtown Stockton	170,568	171,500	932	0.5%
Lathrop–Manteca	346,430	348,300	1,870	0.5%
Tracy	336,835	338,600	1,765	0.5%
Vasco Road	131,409	131,900	491	0.4%
Livermore	161,677	162,400	723	0.4%
Pleasanton	465,965	467,800	1,835	0.4%
Fremont	259,931	260,500	569	0.2%
Great America	792,199	792,200	1	0.0%
Santa Clara	143,392	143,400	8	0.0%
San Jose	179,892	179,900	8	0.0%

Source: AECOM, 2024

Post-Pandemic Travel Trends

Ridership forecasting efforts for the North Valley Passenger Rail Strategic Plan began during the tail end of pandemic-related restrictions and California’s COVID-19 State of Emergency, when ridership was still in flux due

to work-from-home policies, business closures, and other effects. Given the unprecedented nature of the pandemic and the uncertainty regarding post-pandemic ridership trends—including the lack of a clear, defined trajectory that could be established from ridership data during the pandemic—the ACE Model was calibrated using base ridership numbers for 2019, the last complete year of “unaffected” data prior to the pandemic.

As part of a November 2023 staff report, the San Joaquin Regional Rail Commission (SJRRRC) noted that the COVID-19 pandemic greatly reduced ACE ridership. However, ACE ridership recovered from 10 percent of pre-pandemic ridership in February 2021 to 45 percent of pre-pandemic ridership in September 2023. SJRRRC noted that extending a trendline through the monthly ridership data during this period indicated that ACE ridership would “reach pre-pandemic ridership levels by August 2028” if recent ridership recovery trends continued.⁽⁵⁾ Because of recent ACE ridership recovery since February 2021, AECOM assumed that ACE ridership in 2030 would not be materially impacted by the COVID-19 pandemic other than by the pandemic’s effects on future demographics.

San Joaquins ridership also was adversely impacted by the pandemic, falling from 1.07 million passengers in FY2019 to 0.43 million passengers in FY2021. However, *San Joaquins* ridership rebounded strongly to 0.71 million and 0.85 million passengers in FY2022 and FY2023, respectively.⁽⁶⁾ Because of the strength and quickness in the *San Joaquins* ridership recovery, AECOM assumed that *San Joaquins* ridership would make a full recovery to pre-pandemic levels prior to 2030.

The demographic growth forecasts used in the ACE Model are based on Caltrans data that at least partially account for some of the effects of the pandemic (e.g., slower population and employment growth).

Demographic Assumptions

The demographic assumptions for the ACE Model and ACTC Model are described below.

ACE Model

The demographic forecasts used in the ACE Model for this ridership modeling effort are long-term socio-economic forecasts by county published by the Transportation Economics Branch of the California Department of Transportation (“Caltrans”). These socio-economic forecasts have been used in developing ridership forecasts for other megaregional and statewide rail planning efforts, including the latest ridership model developed for the CHSRA to support its 2023 Project Update Report on the statewide HSR system.

The Caltrans data are published annually and include both historical data (starting from 2000) and long-term socio-economic forecasts for population, employment, and income. The latest available release of this data (published in 2022) was used, reflecting historical data up through 2021 and forecasts for 2022 through to a horizon year of 2050. Because the dataset includes historical data through 2021, it can be considered to account, at least partially, for some of the effects of the COVID-19 pandemic on overall demographic trends. The demographic forecasts for 2030 were incorporated into the ACE Model, as that data corresponds with the forecast year for this ridership modeling effort.

(5) “Item 4: Approve a Resolution of the Board of Commissioners of the San Joaquin Regional Rail Commission Authorizing the Executive Director to Submit a Request for \$28,950,000 in Senate Bill (SB) 125 Funding from the San Joaquin Council of Governments (SJCOG) including \$19,950,000 for Operating Funding for Existing ACE Service and \$9,000,000 for the Cabral Station Annex and to Submit a Request for \$8,550,000 in SB 125 Funding from the Metropolitan Transportation Commission (MTC) for Operating Funding for Existing ACE Service” (staff report) from San Joaquin Regional Rail Commission Regular Board Meeting on Friday, November 3, 2023, available at <https://d2j5fyfnufxt9o.cloudfront.net/wp-content/uploads/2023/10/30/172331/SJRRRC-November-3-2023-Meeting-Agenda-Packet.pdf>.

(6) Amtrak annual fiscal year ridership summaries available at the following URLs:
<https://media.amtrak.com/wp-content/uploads/2019/11/FY19-Year-End-Ridership.pdf>
<https://media.amtrak.com/wp-content/uploads/2021/12/FY21-Year-End-Revenue-and-Ridership.pdf>
<https://media.amtrak.com/wp-content/uploads/2022/11/FY22-Year-End-Revenue-and-Ridership.pdf>
<https://media.amtrak.com/wp-content/uploads/2023/11/Copy-of-FY23-Year-End-Ridership.pdf>

The ACE Model, however, requires demographic data for catchment areas around each station, as ridership is forecasted at the station-pair level. To translate county-level demographic data to station catchment-level data, the county-level forecasts were first broken down to the Census county division (CCD) level—a subcounty geographic unit defined by the Census Bureau—using Census data on the ratios of population and employment within each CCD and the corresponding county as a whole. AECOM then employed a custom geographic information system (GIS) application to calculate the population and employment contained within buffers around each station. Buffers ranging in radius from five to twenty miles around stations were used, and the weighted average population and employment for each buffer were inputted into the ACE Model.

A passenger survey conducted by SJRRC in 2014 indicated that a sizeable share of existing ACE passengers reported places of residence and employment well beyond walking distance of stations. Some passengers, for example, reported places of residence in Modesto (20 miles from Lathrop–Manteca Station), Brentwood (20 miles from Vasco Road Station), and Danville (15 miles from Pleasanton Station). For intercity services such as the *San Joaquins*, it can also be expected that some passengers might travel similar (or even longer) distances to/from stations, particularly given that distances between stations are generally larger on the existing *San Joaquins* route than on the existing ACE route. The inclusion of station buffers as large as 20 miles in radius therefore ensures that the total population and employment adequately reflect the actual catchment area of stations for the combined ACE and *San Joaquins* system.

Table 5 below summarizes population and employment growth between the base year (2019) and horizon year (2030) for representative counties along or near the future expanded ACE and *San Joaquins* system.

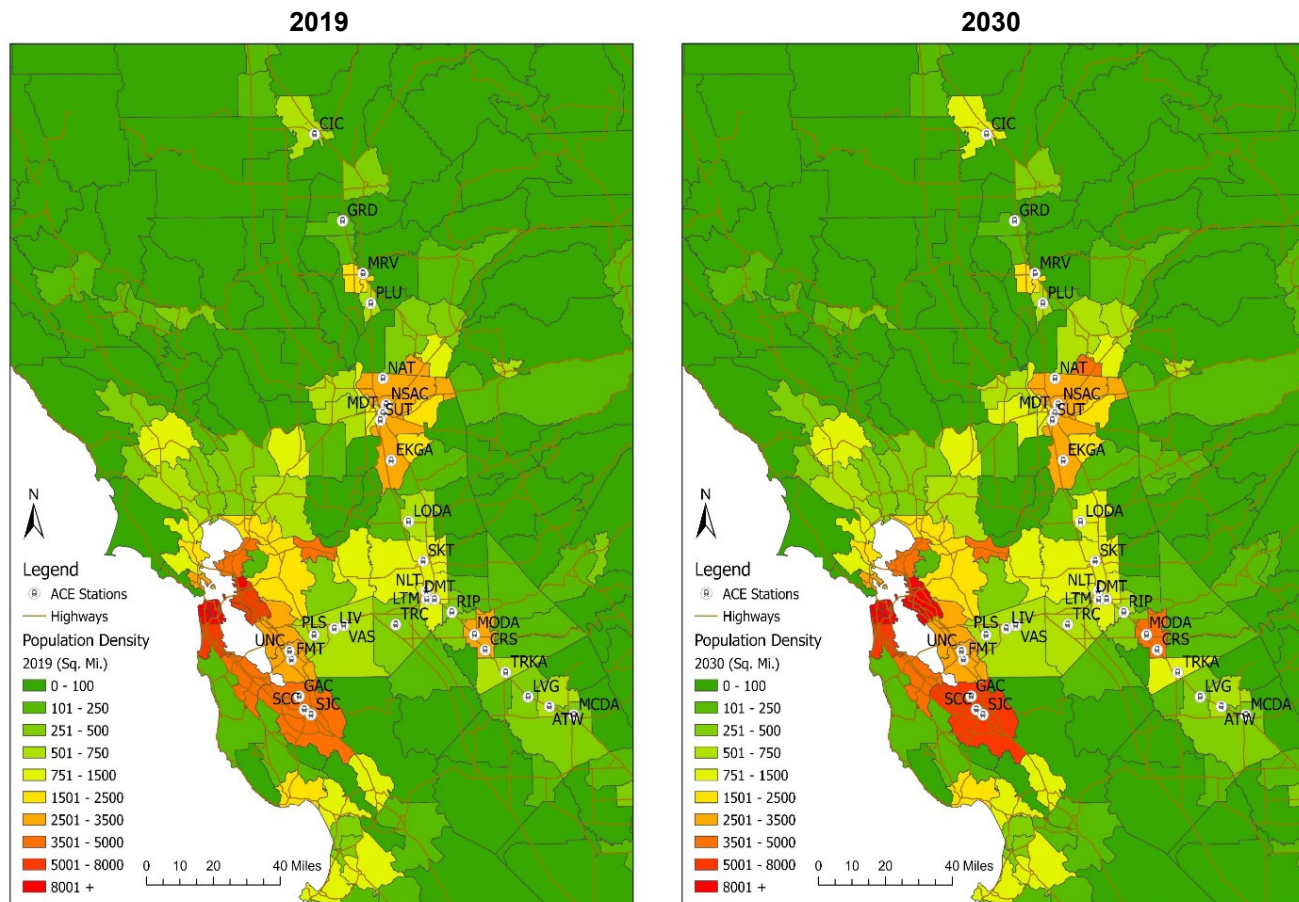
Table 5. Population and Employment Growth by County

Region	County	Population (in thousands)			Employment (in thousands)		
		2019	2030	Growth	2019	2030	Growth
San Francisco Bay Area	Alameda	1,654	1,727	4%	811	889	10%
	Contra Costa	1,137	1,181	4%	374	413	11%
	San Francisco	888	910	2%	763	881	15%
	San Mateo	768	763	(1%)	415	462	11%
	Santa Clara	1,942	2,041	5%	1,132	1,281	13%
San Joaquin Valley	Merced	279	308	10%	70	79	12%
	San Joaquin	761	838	10%	247	296	20%
	Stanislaus	549	598	9%	181	207	14%
Sacramento Area	Placer	391	458	17%	175	208	19%
	Sacramento	1,535	1,697	11%	675	767	14%
	Yolo	219	233	7%	110	122	11%
North Valley	Butte	213	223	5%	81	85	6%
	Sutter	102	107	5%	28	30	9%
	Yuba	77	86	11%	19	21	10%

Source: AECOM, 2023

As the ACE Model uses a finer level of geography than the county level, it is also useful to visualize this growth on a map. **Figure 1**, for example, illustrates population density (people per square mile) for the base year (2019) and horizon year (2030), showing population growth in the Central Valley (e.g., Tracy, Modesto, Turlock, Lodi, and Chico) that will help support the expanded ACE and *San Joaquins* system.

Figure 1. Population Density



Source: AECOM, 2023.

ACTC Model

The BLVX version of the ACTC Model used land use and socio-economic databases developed by ABAG and MTC as part of Plan Bay Area (PBA), which is the regionally adopted long-range plan for the nine-county Bay Area. Therefore, employment data for all Bay Area counties was readily available from the Plan Bay Area databases. The land use data were updated based on PBA40 forecasts (developed as part of Plan Bay Area 2040, adopted in 2017), as land use data for the latest PBA cycle (Plan Bay Area 2050) for the ACTC zone structure was still being developed and was not available for use at the time the ACTC Model inputs were under development for this ridership forecasting effort.

San Joaquin County, however, is outside the nine-county Bay Area, and is under the jurisdiction of SJCOG, a separate MPO from the Bay Area's MTC. Therefore, the employment numbers for this county were obtained from SJCOG's RTP.⁽⁷⁾ The San Joaquin County demographic data was updated using SJCOG's 2018 RTP, which was the latest available data source at the time of the update.⁽⁸⁾

As described in further detail later in this memorandum, ridership forecasts were developed for an approximate opening year (assumed to be 2030). Demographics from the 2018 version of the ACTC Model, which contains

(7) BART to Livermore Ridership Projections Report, February 2018

(8) SJCOG's 2022 RTP was published in late August of 2022, after modeling work for the North Valley Passenger Rail Strategic Plan was well underway. Furthermore, the TAZ data was not yet fully approved at that time. Therefore, it was determined that for this effort, data from the 2018 RTP would be utilized.

data for 2020 and 2040 (based on PBA 2040), was utilized for this study, with the 2030 data derived by interpolating between the 2020 and 2040 data.

For TAZs within San Joaquin County (TAZs 2301–2326), demographic data published by San Joaquin County for 2024 and 2042 (based on the 2018 RTP) were interpolated to derive data for 2030. An equivalency between San Joaquin County zones and the TAZ system in the ACTC Model was then established, and the demographic data for the San Joaquin County zones in the ACTC Model was updated based on this equivalency.

Consistency across Demographic Datasets

As described above, several different demographic datasets were used to develop the ridership forecasts due to the distinct geographies of the two models (ACE Model and ACTC Model) that comprise the joint model. Since work on the ridership forecasting effort began, MTC has also published and approved demographic projections for the latest Plan Bay Area cycle, Plan Bay Area 2050. To address potential concerns about consistency between the Caltrans socio-economic forecasts used in the ACE Model, the PBA40 forecasts used in the ACTC Model, and the PBA50 forecasts most recently developed by ABAG and MTC, AECOM conducted a consistency check in areas that are common to both the Caltrans and PBA datasets (i.e., where the geographies overlap).

Table 6 below compares the forecasts for 2030 from the Caltrans and PBA datasets, for each of the nine Bay Area counties. As PBA50 forecasts were only available for a 2015 base year and a 2035 horizon year, data from these two years were interpolated to obtain an estimate for a 2030 horizon year. PBA40 and PBA50 data were aggregated from the TAZ level to the county level to compare to the Caltrans data.

As shown in **Table 6**, the PBA40 and PBA50 forecasts are very similar overall, and both are generally slightly higher than the Caltrans Transportation Economics Branch forecasts used in the ACE Model, although the PBA40 employment forecasts for Santa Clara County are slightly lower than the corresponding Caltrans forecasts. Where the PBA forecasts are higher than the Caltrans forecasts, the difference is on the order of five to 10 percent above the Caltrans forecasts for the two most relevant counties for ACE service (Alameda and Santa Clara). To the extent that the Caltrans forecasts are less aggressive than the PBA40 or PBA50 forecasts, ridership forecasts produced by the ACE Model will therefore be slightly lower (and more conservative) than if demographic inputs were based on either of the PBA forecasts.

Table 6. Comparison of Demographic Forecasts (2030) by County

Region	Caltrans Transportation Economics Branch		Plan Bay Area 2040				Plan Bay Area 2050			
	Pop.	Emp.	Pop.	Diff.	Emp.	Diff.	Pop.	Diff.	Emp.	Diff.
Alameda	1,726,911	888,744	1,861,141	8%	911,513	3%	1,884,970	9%	963,467	8%
Contra Costa	1,180,586	413,250	1,257,081	6%	461,656	12%	1,249,211	6%	471,235	14%
Marin	250,484	127,370	269,274	8%	135,795	7%	301,022	20%	119,137	(6%)
Napa	134,332	82,290	151,440	13%	75,712	(8%)	142,270	6%	79,618	(3%)
San Francisco	909,907	880,837	1,033,063	14%	832,732	(5%)	1,003,059	10%	770,976	(12%)
San Mateo	763,441	462,051	852,148	12%	419,342	(9%)	847,235	11%	454,732	(2%)
Santa Clara	2,041,475	1,281,191	2,212,883	8%	1,182,221	(8%)	2,273,004	11%	1,325,985	3%
Solano	454,342	162,584	469,675	3%	147,419	(9%)	436,478	(4%)	163,050	0%
Sonoma	483,855	232,643	560,053	16%	238,736	3%	510,315	5%	243,014	4%
Total	7,945,334	4,530,960	8,666,758	9%	4,405,126	(3%)	8,647,562	9%	4,591,214	1%

Source: AECOM, 2023

Note:

pop. = population; emp. = employment; diff. = difference (relative to Caltrans data)

Scenarios and Forecasts

The last of the three primary inputs driving the ACE Model is the service plan. The assumed service plan scenarios and resulting forecasts are described below.⁽⁹⁾ Ridership impacts, including passenger revenue (order-of-magnitude estimate only) and avoided vehicle miles traveled (VMT), are also presented. All the numbers shown below represent the final forecasts after application of the long-term ridership recovery factors to both intercity and commuter rail services.

Service Plan Scenarios

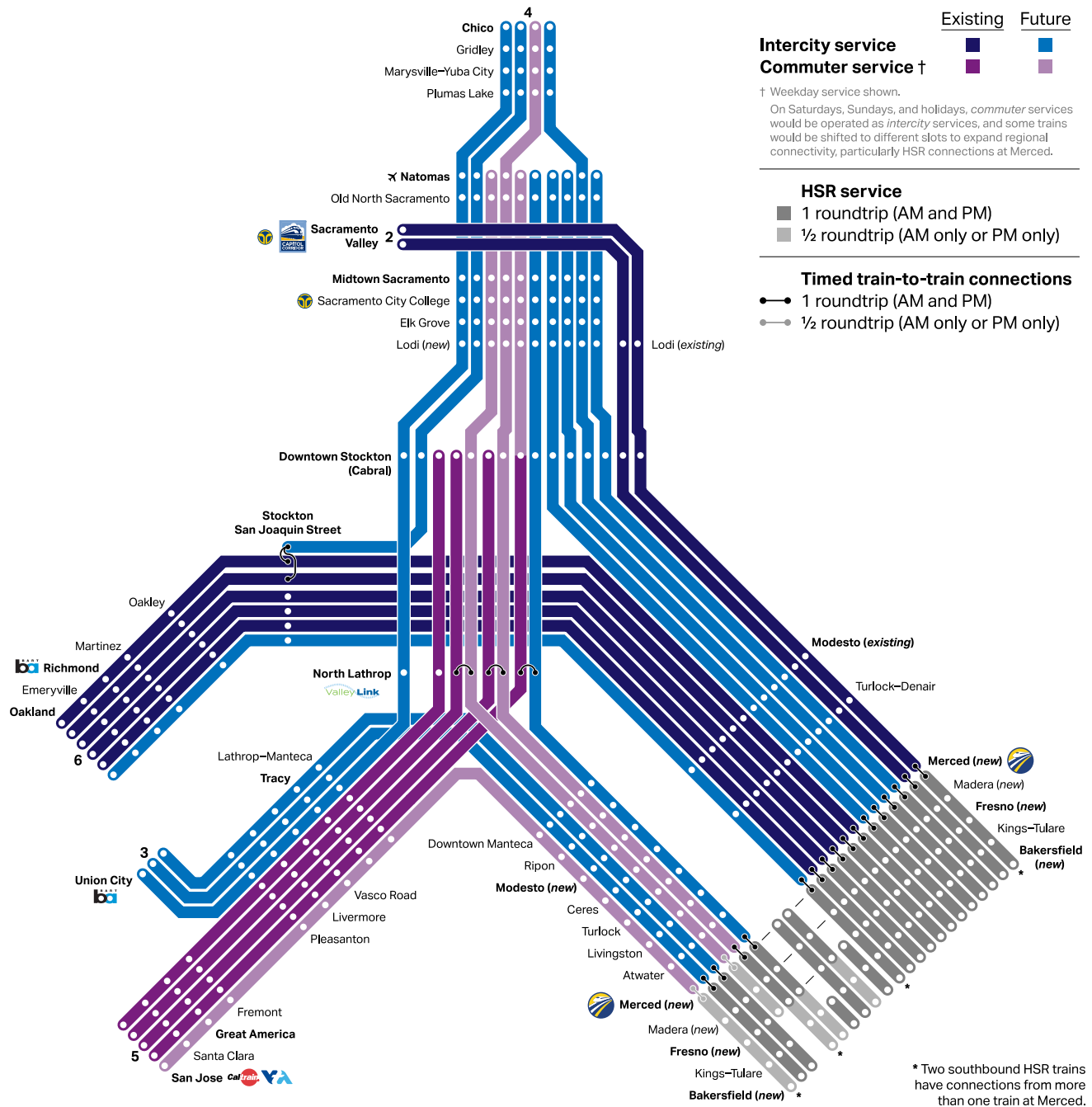
As mentioned in the California High-Speed Rail Authority (CHSRA) 2022 Business Plan, service on the EOS between Merced and Bakersfield is scheduled to be operational by the end of 2030.⁽¹⁰⁾ Therefore, HSR service between Merced and Bakersfield, together with the planned ACE service to Union City and expanded Valley Rail Program (both of which will provide service connecting with HSR in Merced), was included in the ridership forecasts for 2030 to appropriately capture the connections between HSR and ACE and between HSR and the *San Joaquins*.

A diagram of the integrated ACE and *San Joaquins* systems in 2030, including the North Valley Rail portion north of Natomas, is shown in **Figure 2**. **Figure 2** also illustrates the proposed service plan for North Valley Rail, which encompasses four roundtrips by 2030, including two to/from Merced for direct connections with HSR; one to/from Stockton San Joaquin Street, with timed connections with the *San Joaquins* for ongoing travel to/from the Bay Area and HSR in Merced; and one to/from Union City via the new ACE extension being planned as part of the SoCo Rail Study.

(9) The ridership forecasts in this technical memorandum are preliminary and intended only for the purposes of project planning and development. Refinements to the forecasts will be incorporated in subsequent stages of the project to support the project's environmental clearance phase.

(10) The CHSRA's 2023 Project Update Report, published on March 1, 2023, subsequently revised the start of service to an "envelope" between 2030 and 2033, recognizing that stable funding sources to achieve the 2030 opening ultimately feed into the risk in the overall project schedule. However, a 2030 forecast year was retained for this combined ridership forecasting effort for the North Valley Passenger Rail Strategic Plan, SoCo Rail Study, and expanded Valley Rail Program, recognizing that it is critical to have the proposed service expansions (including the HSR connections, in particular) operational from Day 1 of the HSR EOS, which could take place as early as 2030 (or as late as 2033). Continuing to assume a 2030 horizon year generally results in a lower (and therefore more conservative) ridership forecast for the project due to demographic growth over time. If the project is operational before the HSR EOS, there may be some period of time during which the project operates a reduced or modified service commensurate with lower ridership demand due to the lack of connecting HSR service in Merced.

Figure 2. Integrated ACE and San Joaquins Network (2030)



Source: AECOM, 2023.

The ridership modeling work includes both the No Build and Build Scenarios for the forecast year of 2030. The assumptions for both No Build and Build are summarized in **Table 7**, with more detailed descriptions of each scenario below. The primary differences between the No Build and Build Scenarios relate to the four roundtrips proposed for extension north of Natomas and assumptions regarding the corresponding service on Thruway Bus Route 3 within the North Valley, as the NVRP would replace Route 3 service in the North Valley with train service.

- **Current Thruway Bus Route 3 Service.** Currently, Thruway Bus Route 3 provides supplemental service for the Sacramento branch of the *San Joaquins*, as *San Joaquins* trains operate five roundtrips on the Bay Area (Oakland) branch but only two roundtrips on the Sacramento (Sacramento Valley) branch.⁽¹¹⁾ Route 3 buses have timed connections with Oakland-branch *San Joaquins* trains at Stockton San Joaquin Street for continuing service south of Stockton. Intermediate stops on Route 3 include the existing Lodi station and the existing Elk Grove stop (Harbor Point Drive at Renwick Avenue).
- **Future baseline service on Thruway Bus Route 3 (No Build).**
 - In the future baseline (i.e., No Build Scenario), a sixth daily roundtrip would be added to the Oakland branch of the *San Joaquins* train service, and Route 3 service is correspondingly assumed to increase to six roundtrips.
 - With implementation of new rail service between Stockton and Sacramento (Natomas) via the Valley Rail Sacramento Extension, Thruway Bus routing is also assumed to shift to follow the new rail alignment, with intermediate stops at all of the planned stations: Lodi (new), Elk Grove, Sacramento City College, Midtown Sacramento, Old North Sacramento, and Natomas. Between Midtown Sacramento and Old North Sacramento, Thruway buses are also assumed to detour to the west to provide an additional (new) stop at Sacramento Valley Station. Thruway Bus service at the existing Lodi station and at the existing Elk Grove stop is assumed to be discontinued.
 - Service to/from Red Bluff and Redding is also assumed to be discontinued, with connections for these areas instead provided by the planned Salmon Runner service being pursued by the Shasta Regional Transportation Agency (SRTA).
 - Of the six daily roundtrips, four are assumed to continue north of Natomas to/from Chico along the current Thruway routing and stops—i.e., Marysville (near the Yuba County Government Center), Oroville (Oroville Park-and-Ride lot at Third Street/Grand Avenue), and Chico (existing Amtrak station). As with the current Route 3, no stops would be provided at Plumas Lake or Gridley.
- **Replacement of Thruway Bus Route 3 service north of Natomas with North Valley Rail (Build).**
 - In the Build Scenario, rail service is extended north of Natomas, with service on Thruway Bus Route 3 truncated at Natomas. The four bus roundtrips continuing north of Natomas in the No Build Scenario would instead be replaced by the four rail roundtrips proposed by North Valley Rail. This would be accomplished by extending four of the 10 planned daily train roundtrips at Natomas north into the North Valley. New Thruway bus service within the North Valley would provide timed connections with North Valley Rail trains at Gridley for service to/from Oroville.
 - In addition to the four rail roundtrips, North Valley Rail would also provide supplemental Thruway Bus service within the North Valley corridor to provide connections for the remaining six daily train roundtrips at Natomas that would not continue beyond to/from the North Valley.

In both No Build and Build ridership modeling runs, all trains serving Merced are assumed to have direct timed connections with HSR, allowing connections to/from the Madera, Fresno, Kings–Tulare, and Bakersfield HSR stations. Thruway bus services between Bakersfield and Los Angeles are also included in the forecasts to account for continuing connections originating from or destined for Southern California.

(11) One of the Sacramento-branch roundtrips is still currently suspended after COVID-related service reductions and is not currently in operation.

Table 7. Scenario Descriptions

Service	2030 No Build	2030 Build
San Joaquins	<ul style="list-style-type: none"> Existing seven daily roundtrips, all truncated at Merced 	<ul style="list-style-type: none"> Existing seven daily roundtrips, all truncated at Merced
	<ul style="list-style-type: none"> One additional roundtrip between Oakland and Merced 	<ul style="list-style-type: none"> One additional roundtrip between Oakland and Merced
	<ul style="list-style-type: none"> Four additional roundtrips between Natomas and Merced 	<ul style="list-style-type: none"> Three additional roundtrips between Natomas and Merced One additional roundtrip between Chico and Merced
	<ul style="list-style-type: none"> Connecting to HSR at Merced 	<ul style="list-style-type: none"> Connecting to HSR at Merced
	<ul style="list-style-type: none"> Six roundtrips on Thruway bus Route 3 between Stockton San Joaquin Street and Natomas, with four of these continuing north of Natomas and serving the existing Route 3 stops in Marysville, Oroville, and Chico 	<ul style="list-style-type: none"> Six roundtrips on Thruway bus Route 3 between Stockton San Joaquin Street and Natomas, with no Route 3 service north of Natomas
ACE (commuter)	<ul style="list-style-type: none"> Four existing ACE roundtrips, with one of them extending to Natomas 	<ul style="list-style-type: none"> Four existing ACE roundtrips, with one of them extending to Natomas
	<ul style="list-style-type: none"> One roundtrip between San Jose and Merced 	<ul style="list-style-type: none"> One roundtrip between San Jose and Merced
	<ul style="list-style-type: none"> Two roundtrips between Natomas and Merced 	<ul style="list-style-type: none"> One roundtrip between Natomas and Merced One roundtrip between Chico and Merced
ACE (intercity)	<ul style="list-style-type: none"> Connecting to HSR at Merced 	<ul style="list-style-type: none"> Connecting to HSR at Merced
	<ul style="list-style-type: none"> One roundtrip between Natomas and Merced 	<ul style="list-style-type: none"> One roundtrip between Natomas and Merced
	<ul style="list-style-type: none"> One roundtrip between Natomas and Stockton San Joaquin Street (with connections to <i>San Joaquins</i> trains) 	<ul style="list-style-type: none"> One roundtrip between Chico and Stockton San Joaquin Street (with connections to <i>San Joaquins</i> trains)
	<ul style="list-style-type: none"> One roundtrip between Natomas and Union City 	<ul style="list-style-type: none"> One roundtrip between Chico and Union City
	<ul style="list-style-type: none"> Two additional roundtrips between Union City and Merced 	<ul style="list-style-type: none"> Two additional roundtrips between Union City and Merced
	<ul style="list-style-type: none"> Connecting to HSR at Merced 	<ul style="list-style-type: none"> Connecting to HSR at Merced

Source: AECOM, 2023

Note:

Bold red text indicates difference between scenarios.

All roundtrips for ACE and the *San Joaquins*, including both commuter and intercity services, are assumed to operate daily in the future, for both the No Build and Build scenarios. Prior to the COVID-19 pandemic, SJRRC had already been operating limited event-day ACE service outside of the typical commute service to accommodate demand generated at Levi's Stadium in Santa Clara (including for San Francisco 49ers home games, typically held on Sundays). SJRRC also began operating a pilot Saturday ACE service with two roundtrips in September 2019, although the program was eventually suspended in March 2020 due to pandemic-related effects.

The weekend/holiday timetable is conservatively assumed to be the same as the weekday timetable, with only minor adjustments to shift some ACE trains serving Merced to provide more attractive slots for weekend and holiday travelers making connections with HSR. Under the Build scenario, adjustments for the proposed four North Valley Rail trains on weekends and holidays are conservatively not assumed. The final refined timetable concept for North Valley Rail is shown in **Table 8**.

It should be noted that infrastructure improvements at certain points south of Natomas may be required for some trains to achieve the conceptual timetable, including the running times and desired slots (times of day). The exact location and scope of such improvements will be determined in coordination with Union Pacific Railroad ("UP") as part of more detailed operations planning for the larger Valley Rail Program, including the planned Union City extension.

Table 8. North Valley Rail Service Conceptual Timetable

Southbound						Northbound									
W01	D01	J04	J01	N06	C04	Station			C03	N01	J10	J07	D02	W02	
CIC	CIC	OKJ	MCDA	CIC	CIC	Train Origin			MCDA	MCDA	OKJ	MCDA	SKN	UNC	
UNC	SKN	MCDA	OKJ	MCDA	MCDA	Train Destination			CIC	CIC	MCDA	OKJ	CIC	CIC	
6:02	7:02			10:30	17:03	▼	Chico	CIC	▲ 9:43	15:15			18:28	19:49	
6:26	7:26			10:54	17:27	▼	Gridley	GRD	▲ 9:19	15:51			18:04	19:25	
6:44	7:44			11:11	17:45	▼	Marysville–Yuba City	MRV	▲ 9:00	14:34			17:45	19:06	
6:54	7:54			11:21	17:55	▼	Plumas Lake	PLU	▲ 8:51	14:24			17:36	18:57	
7:17	8:17			11:44	18:18	▼	Natomas	NAT	▲ 8:28	14:02			17:13	18:34	
7:33	8:33			11:52	18:27	▼	Old North Sacramento	NSAC	▲ 8:19	13:53			17:04	18:25	
7:39	8:39			11:58	18:33	▼	Midtown Sacramento	MDT	▲ 8:13	13:48			16:58	18:19	
7:44	8:44			12:02	18:38	▼	Sacramento City College	SUT	▲ 8:08	13:42			16:53	18:14	
7:54	8:54			12:12	18:48	▼	Elk Grove	EKGA	▲ 7:59	13:33			16:44	18:05	
8:20	9:20			12:37	19:14	▼	Lodi (<i>new</i>)	LODA	▲ 7:33	13:09			16:18	17:39	
8:34	9:34			12:51	19:28	▼	Downtown Stockton (Cabral)	SKT	▲ 7:18	12:55			16:03	17:24	
	9:38 → 9:48			9:53			▼	Stockton San Joaquin Street	SKN	▲				15:48	15:53 → 15:58
8:44					19:38	▼	North Lathrop	NLT	▲ 7:07					17:13	
8:51						▼	Lathrop–Manteca	LTM	▲					17:07	
9:03						▼	Tracy	TRA	▲					16:48	
9:32						▼	Vasco Road	VAS	▲					16:19	
9:37						▼	Livermore	LIV	▲					16:14	
9:45						▼	Pleasanton	PLS	▲						16:05
						▼	Fremont	FMT	▲						
						▼	Great America	GAC	▲						
						▼	Santa Clara	SCC	▲						
						▼	San Jose (Diridon)	SJC	▲						
10:09						▼	Union City	UNC	▲					15:40	
			10:22			▼	Oakley	OKY	▲			15:21			
			10:29			▼	Antioch–Pittsburg	ACA	▲			15:13			
			10:54			▼	Martinez	MTZ	▲			14:51			
			11:23			▼	Richmond	RIC	▲			14:21			
			11:34			▼	Emeryville	EMY	▲			14:10			
			11:43			▼	Oakland (Jack London Square)	OKJ	▲			13:59			
					19:48	▼	Downtown Manteca	DMT	▲ 6:58						
				19:57	▼	Ripon	RIP	▲ 6:49							
				20:10	▼	Modesto (<i>new</i>)	MODA	▲ 6:35							
				20:17	▼	Ceres	CRS	▲ 6:28							
				20:27	▼	Turlock	TRKA	▲ 6:18							
				20:40	▼	Livingston	LVG	▲ 6:06							
				20:47	▼	Atwater	ATW	▲ 5:58							
		10:20		13:20		▼	Modesto	MOD	▲	12:26		15:26			
		10:33		13:33		▼	Turlock–Denair	TRK	▲	12:13		15:13			
		11:00		14:00	20:56	▼	Merced (<i>new</i>)	MCDA	▲ 5:50	11:46		14:46			
		↓		↓	↓			↑	↑			↑			
		11:08		14:08	21:08	▼	Merced	▲	5:42	11:42		14:42			
		11:30		14:30	21:30	▼	Madera	▲	5:21	11:21		14:21			
		11:41		14:41	21:41	▼	Fresno	▲	5:09	11:09		14:09			
		11:58		14:58	21:58	▼	Kings–Tulare	▲		10:53		13:53			
		12:30		15:30	22:30	▼	Bakersfield	▲		10:19		13:19			
		111		117	131			ST-2	110			116			

Source: AECOM

Forecast Results

The following subsections present the forecast results, including a high-level summary, a detailed station-level summary, and an ACE market flow summary. As mentioned previously, all results reflect application of the post-pandemic long-term ridership recovery factors described previously.

High-Level Summary

The forecasted 2030 annual ridership and incremental ridership between No Build and Build are shown in **Table 9**. Annual total and incremental passenger miles travelled (PMT) and avoided VMT are also presented. For reference, actual pre-pandemic annual ridership was approximately 1,506,200 for ACE in 2019 and 1,059,000 for the *San Joaquins* in FY 2019.⁽¹²⁾ The ridership forecasts in **Table 9** have been thoroughly reviewed to assure reasonableness, including a comparison against forecasts produced by the Early Train Operator for the CHSRA's 2023 Project Update Report.

As shown in **Table 9**, ridership across the combined ACE and *San Joaquins* network is forecasted to increase by 476,200 passengers (9 percent) as a result of the extension of the four roundtrips north of Natomas into the North Valley. Average daily ridership for the entire combined ACE and *San Joaquins* network would also increase at the same proportions by approximately 1,305 passengers. Total annual revenue, PMT, and avoided VMT for the whole system are forecasted to increase at similar proportions.

Table 9. Forecasted Ridership, Revenue, and Avoided VMT (2030)

	2030 No Build	2030 Build	
		Total	Change (relative to No Build)
Annual ridership	5,336,400	5,812,600	476,200
<i>Train-only (non-transfers)</i>	<i>3,834,800</i>	<i>4,220,100</i>	<i>385,300</i>
<i>Transfers with HSR</i>	<i>1,336,500</i>	<i>1,375,200</i>	<i>38,700</i>
<i>Transfers between ACE and San Joaquins</i>	<i>60,300</i>	<i>69,000</i>	<i>8,700</i>
<i>Transfers with Thruway bus</i>	<i>104,800</i>	<i>148,300</i>	<i>43,500</i>
Average daily ridership	14,620	15,925	1,305
Annual revenue (a)	70,350,400	77,439,300	7,088,900
Annual PMT	562,838,000	605,507,500	43,119,500
Annual avoided VMT	409,009,200	440,368,600	31,359,400

Source: AECOM, 2024

Note:

(a) Annual revenue is in 2023 dollars. Reflects revenue assigned to ACE or the *San Joaquins* (i.e., ACE or *San Joaquins* train trips, or associated bus trips with a direct connection to or from an ACE or *San Joaquins* train). As trip portions south of Merced are assigned to the HSR EOS, revenue for those trip portions is not included in the annual revenue presented here.

Station-Level Detail

Annual station boardings and alightings for the combined ACE and *San Joaquins* system are summarized for the No Build Scenario and for both route options under the Build Scenario in **Table 10**. Ridership increases in the Build Scenario are primarily on the Valley Rail Sacramento (Natomas) Extension (as these areas are closer to the North Valley and have more frequent service) and on connecting trips with HSR.

(12) ACE ridership cited here is for 2019 from the Federal Transit Administration's National Transit Database. *San Joaquins* ridership cited here is from the latest (2022) business plan published by the San Joaquin Joint Powers Authority and represents Fiscal Year (FY) 2019 data (the fiscal year is based on Amtrak's fiscal year, which runs from October through September).

Table 10. Annual Station Boardings and Alightings

	2030 No Build	2030 Build
Merced (new)	1,544,400	1,597,300
<i>Non-transfers</i>	207,900	222,100
<i>Transfers with HSR</i>	1,336,500	1,375,200
Atwater	15,300	15,900
Livingston	10,700	11,100
Turlock	25,700	26,800
Ceres	34,700	36,000
Modesto (new)	165,900	170,100
Ripon	70,600	72,000
Downtown Manteca	90,600	91,300
Chico	—	166,900
Gridley	—	61,400 (a)
Marysville–Yuba City	—	166,000
Plumas Lake	—	83,800
Natomas	225,100	308,700
Old North Sacramento	178,100	244,300
Midtown Sacramento	347,000	475,900
Sacramento City College	187,500	257,100
Elk Grove	378,900	402,800
Lodi (new)	183,800	187,500
Downtown Stockton	351,000	353,100
Stockton San Joaquin Street	314,600	321,800
<i>Non-transfers</i>	250,600	252,800
<i>Transfers between ACE and San Joaquins</i>	60,300	69,000
<i>Transfers with Thruway bus for Sacramento and North Valley</i>	3,700	—
North Lathrop	235,000	235,800
Lathrop–Manteca	205,000	205,400
Tracy	667,700	668,800
Vasco Road	250,300	250,800
Livermore	298,800	299,000
Pleasanton	851,000	851,700
Union City	650,600	661,100
Fremont	438,900	440,000
Great America	1,294,400	1,296,500
Santa Clara	267,700	268,700
San Jose	366,700	369,300
Turlock–Denair	71,000	74,600
Modesto (existing)	234,500	246,600
Lodi (existing)	18,900	18,900
Sacramento	97,900	102,500
Oakley	60,400	60,700
Martinez	237,000	238,100
Richmond	83,600	84,700
Emeryville	85,200	86,300
Oakland	144,200	145,400
Total	10,682,700	11,654,700

Source: AECOM, 2024

Note:

Reported ridership represents unconstrained values.

(a) Includes Thruway bus transfers to/from Oroville.

Market Flow Summary

To help characterize general ridership trends at the regional level for the North Valley Rail trains, a market-level flow summary was also prepared by aggregating station-pair ridership into discrete markets based on geography (e.g., Tri-Valley, Sacramento Area, etc.). While **Table 9** and **Table 10** show how ridership across the combined ACE and *San Joaquins* system changes as a result of North Valley Rail, the market flow summary helps characterize where riders in the North Valley are heading to or from at the interregional level. The market-level flow summary is provided below in **Table 11**.

Table 11. Market Flow Summary

Market	Stations	Annual ridership
Internal (within North Valley)	Chico, Gridley, Marysville–Yuba City, Plumas Lake	7,000
External (North Valley to / from)		
Sacramento Area	Sacramento, Natomas, Old North Sacramento, Midtown Sacramento, Sacramento City College, Elk Grove	357,600
San Joaquin Valley North	Lodi, Lodi (new), Downtown Stockton, Stockton San Joaquin Street, North Lathrop, Lathrop–Manteca, Tracy	9,400
San Joaquin Valley Central	Merced, Turlock–Denair, Modesto, Merced (new), Atwater, Livingston, Turlock, Ceres, Modesto (new), Ripon, Downtown Manteca	25,500
Tri-Valley	Vasco Road, Livermore, Pleasanton	1,600
Union City	Union City	10,800
Fremont	Fremont	1,100
Silicon Valley	Great America, Santa Clara, San Jose	5,700
Northern/Eastern Contra Costa County	Oakley, Martinez	1,500
Inner Bay Area	Richmond, Emeryville, Oakland	3,400
HSR (a)	Madera, Fresno, Kings–Tulare, Bakersfield, Southern California	38,700
<i>Southern California</i>	<i>Los Angeles and other Thruway bus connections in Southern California</i>	<i>6,700</i>
Total		462,300

Source: AECOM, 2024

Note:

(a) Includes Thruway bus transfers to/from Los Angeles and other locations in Southern California.

As shown in **Table 11**, the largest market flows are associated with the following station groups:

- “Sacramento Area” group, including Sacramento, Natomas, Old North Sacramento, Midtown Sacramento, Sacramento City College, and Elk Grove: 357,600
- “HSR” group, including Madera, Fresno, Kings–Tulare, Bakersfield, and Southern California (Los Angeles and other Thruway bus connections): 38,700
- “San Joaquin Valley Central” group, including Merced, Turlock–Denair, Modesto, Merced (new), Atwater, Livingston, Turlock, Ceres, Modesto (new), Ripon, Downtown Manteca: 25,500

Trips to/from the Sacramento Area represent shorter-distance trips that are able to capture a wide variety of demand, including commuters, day-trip (e.g., business or leisure) travelers, and other passengers. For most markets beyond Sacramento—such as the northern and central San Joaquin Valley and the Bay Area—demand is strong but lower than for the Sacramento Area, reflecting longer travel distances, less frequent service, and/or the added inconvenience of transfers.

Train Capacity Analysis

In addition to the ridership forecasts, the ridership modeling effort included an analysis of passenger load between adjacent stations served by North Valley Rail trains to identify potential capacity issues related to using different trainset equipment. In order to minimize capital costs for the new service, it is worthwhile to consider designing any new infrastructure, at least in the initial stages, for trainsets shorter than the design standard being used elsewhere in the Valley Rail Program. If desired and warranted by ridership demand, the infrastructure can then be expanded at a later time to the full design standard.

BCAG and SJRRC have already indicated their preliminary intention to move forward with a design for North Valley Rail based on a Bombardier BiLevel trainset with 8 passenger coaches, which is shorter than the maximum length of 10 passenger coaches being assumed at most of the new Valley Rail stations. Based on specific design considerations at each station, the platform length to accommodate an 8-car Bi-Level trainset ranges from 705 feet to 810 feet. This decision is consistent with the strategy to accommodate an 8-car Bi-Level trainset for the planned platform at the Union City Intermodal Station (that platform is specified to be 745 feet in length).

The exact type of trainset(s) to be used on North Valley Rail is not known at this time however, but could consist of one or more models that are currently being considered across the future ACE and *San Joaquins* systems. For the purposes of this train capacity analysis, three trainset types have been evaluated: Bombardier Bi-Level (8-car) train with a total capacity of 1,056 passengers; Siemens Venture (7-car) train with a total capacity of 456 passengers; and Stadler FLIRT (3-unit) train with a total capacity of 672 passengers.

A focused link load analysis was conducted for the eight North Valley Rail single-direction trains to quantify potential crowding levels inside trains. For this analysis, screenlines were placed between each adjacent station pair on a given train's route. A screenline represents an imaginary cordon placed at a given location along a transit route, usually for the purpose of evaluating passenger loads and capacity inside transit vehicles as they pass through the screenline.

For example, if a train serves four stations (A, B, C, and D, in that order) and the passenger load ("link load") is desired for the segment of the line between Station B and Station C, a screenline is placed at that location and the ridership is aggregated between the relevant station pairs passing through the screenline. In this case, the link load would consist of passengers going from A to C, from A to D, from B to C, and from B to D. Passengers going from A to B or from C to D do not pass through the screenline and are therefore not counted.

This process can then be repeated by placing screenlines between the remaining adjacent station pairs for the train (i.e., between A and B and between C and D) to calculate the respective link loads at those locations. Taking the highest passenger load across all of the screenlines yields the maximum link load for that train. When planning a transit service, it is useful to compare the maximum link load to the actual capacity of the transit vehicle to quantify the level of crowding inside the vehicle and confirm that there is sufficient capacity to accommodate the load.

The results of this analysis for the eight North Valley Rail trains (four trains in each direction) are summarized in **Table 12**.

Table 12. Link Load Analysis for North Valley Rail Trains

Direction / Train	Origin (northbound)	Maximum link load	Maximum load point (a)	Capacity utilization at maximum load		
	Destination (southbound)			Bombardier BiLevel (8-car)	Siemens Venture (7-car)	Stadler FLIRT (3-unit)
Northbound						
C03	Merced (new)	167	Midtown Sacramento → Old North Sacto.	16%	37%	25%
N01	Merced (new)	275	Midtown Sacramento → Old North Sacto.	26%	60%	41%
D02	Stockton San Joaquin St.	271	Stockton S. Jqn. Street → Downtown Stockton	26%	59%	40%
W02	Union City	577	Vasco Road → Tracy	55%	127%	86%
Southbound						
W01	Union City	583	Tracy → Vasco Road	55%	128%	87%
D01	Stockton San Joaquin St.	260	Downtown Stockton → Stockton S. Jqn. Street	25%	57%	39%
N06	Merced (new)	226	Old North Sacto. → Midtown Sacramento	21%	50%	34%
C04	Merced (new)	193	Old North Sacto. → Midtown Sacramento	18%	42%	29%

Source: AECOM, 2024

Note:

(a) Because the maximum link load reflects an average daily value, the actual load on a given day may be higher or lower due to day-to-day variability and other factors. The maximum link load for most of the eight trains is based on weekend daily ridership, which is forecasted to generally be higher than weekday ridership for the North Valley Rail trains.

As shown in **Table 12**, none of the proposed North Valley Rail trains would reach their maximum loads within the North Valley section (i.e., anywhere between Chico and Natomas), although 4 of the trains (C03 and N01 in the northbound direction and N06 and C04 in the southbound direction) would have maximum load points slightly south of Natomas in or near Midtown Sacramento. The other 4 trains would have maximum load points in the Stockton area between Downtown Stockton and Stockton San Joaquin Street (D01 and D02), or on the ACE trunk over the Altamont Pass between Tracy and Vasco Road (W01 and W02). Barring the coupling or decoupling of additional cars or units mid-run while in revenue service, however, the trainset length is ultimately determined by the maximum load point over the entire length of the route, even if that load is not reached within the North Valley segment of the route.

Overall, capacity utilization would be highest on the Siemens Venture trainsets due to lower passenger capacity, with two of the eight trains well above the trainset capacity. With the 3-unit Stadler FLIRT trainsets, one of the trains would almost reach the trainset capacity at 87 percent. The capacity utilization for the Bombardier BiLevel trainsets would range from 16 percent to 55 percent, but none of the eight trains would exceed the trainset capacity. Based on the results shown in **Table 12**, a trainset with 8 Bombardier BiLevel passenger coaches or an alternative trainset type of similar length is sufficient to accommodate the maximum loads of any of the proposed trains.

This passenger load analysis is based on annual ridership forecasts for each of the eight trains; the annual forecasts were converted to daily station-to-station ridership estimates that were used to determine passenger load between adjacent stations served by the North Valley Rail trains. It is possible that day-to-day variation in demand may exceed the maximum passenger load between stations for a given train reported in **Table 12**.

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